Mount Nansen Water Resources Investigations Quarterly Report: July – September 2013

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2012 ENVIRONMENTAL EMPLOYER OF THE YEAR

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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 second quarter of the program (Q2), from July 1, 2013 to September 30, 2013.

Over the course of the Q2 period, three monitoring events took place:

- July 15-17, 2013
- August 13-15, 2013
- September 23-25, 2013

The monitoring objectives during this period were to collect surface water data through the summer season leading up to fall. 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 had continuous water level loggers installed, while the remaining stations served as instantaneous discharge measurement locations. Stream gauging methods included the velocity-area method (mid-section method), salt dilution gauging, volumetric, and v-notch weir.

Water quality sampling was completed at 24 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 drinking water quality analysis for a drinking water well.

This report summarizes the site conditions between July 1, 2013 and September 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 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 from each trip are also included. A brief description of the daily and hourly meteorological data for the Q2 period is also presented. A copy of the updated hydrometric, water quality and meteorological databases, containing all raw data, accompanies this report.

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1 INTRODUCTION

Yukon Government Assessment and Abandoned Mines (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 second quarter (Q2) of the program, from July 1, 2013 to September 30, 2013.

The Q2 period consisted of three monitoring events in each month. The dates of each visit are:

- July 15 – 17, 2013
- August 13 – 15, 2013
- September 23 – 25, 2013

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

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

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 were typical of warm, central Yukon summers with characteristically low discharges and warm ambient temperatures. The conditions encountered during each site visit were:

- July 15-17, 2013 – High regional air temperatures, with temperatures above 25°C. Convective thunderstorms typically developed in the late afternoon with occasional rain showers.
- August 13-15, 2013 – Air temperatures were warm and generally above 25°C dropping to 10°C overnight. Several convective thundershowers developed during the daytime with brief, intense showers in the evenings.
- September 23-25, 2013 – Air temperatures were seasonally cool, with cold (< 0°C) temperatures during the night. Snow and ice was present at higher elevations and within much of the upper Dome Creek catchment. Water temperatures had decreased to between 0 °C and 3 °C at most surface water sites.

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: 31/01/2014
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Mount Nansen Map Area

Carmacks

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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. The second quarter (Q2) report consists of data collected between July 1, 2013 and September 30, 2013.

The Q2 report is a continuation of the Q1 program. Methods are identical to those outlined in the Q1 report (EDI 2013a) and results are presented as a continuation of findings from the Q1 period (April 1, 2013 to June 30, 2013). The description and discussion of the results presented in this document is limited to the data collected in the Q2 period.

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 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.

As of July 1, 2013, there were a total of 19 hydrometric stations and 24 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 July 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 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

Station/Site Name	Hydrology	Water Quality	Station/Site ID
Mill Site Seep 03		X	WQ-MS-S-03
Mill Site Seep 08		X	WQ-MS-S-08
Adit Seep		X	WQ-ADIT-SEEP
Back Creek	X	X	H-BC/WQ-BC
Minnesota Creek	X	X	H-MN/WQ-MN
Victoria Creek Reference Site[1]	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] 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 in 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		

Meteorological Parameter	Units	Notes
Net Shortwave	W/m^2	Measured every 5 minutes. Hourly average is reported.
Net Longwave	W/m^2	Measured every 5 minutes. Hourly average is reported.
Net Total Radiation	W/m^2	Measured every 5 minutes. Hourly average is reported.
Wind Speed	m/s	Measured every 5 minutes. Hourly average is reported.
Wind Direction	degrees	Measured every 5 minutes. Hourly average is reported.
Precipitation	mm	Total precipitation recorded hourly.
Snow Depth	cm	Hourly sample recorded.
Air Temperature	°C	Measured every 5 minutes. Hourly average is reported.
Humidity	%	Measured every 5 minutes. Hourly average is reported.
Ground Temperature Surface	°C	Hourly sample recorded.
Barometric Pressure	mbar	Hourly 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 (2013b) 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 July 1, 2013 to September 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 5 (five) instantaneous hydrometric stations (Figure 1; Table 2-2).

A detailed description of each hydrometric station is found in Appendix D, 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 were calculated. 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.

Table 2-3. Mount Nansen hydrometric station information, July 1 to September 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-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	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

[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.

Given the small channel 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 value is lower than what is typically reported for other hydrometric programs (e.g., Water Survey of Canada uses +/-0.01 m^3/s for open water conditions). Field methods used at Mount Nansen can accommodate this higher resolution of discharge under ideal conditions, however measurement uncertainty for each method should be considered when interpreting results. 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.

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 or channel widths were less than 3.0 m.

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 employed during all trips of Q2.

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. Volumetric discharge measurements are used to validate 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).

Following high flows encountered at the start of the open water season of 2013, the channel where the weir was installed had moved. The channel was no longer flowing over the weir location, but maintained flow at the H-PC-U station. No weir head measurements were taken during the course of the Q2 monitoring period.

2.3.5 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.

2.3.6 Hydrometric Validation & QA/QC Program

The velocity-area, weir and volumetric hydrometric measurement methods used for the Mount Nansen hydrometric program are standardized by the WSC and the USGS. Several stations 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 of 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

2.3.7 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, 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 this report only to approximate the high-flows captured during field measurements.

2.3.8 Continuous Stage and Discharge

Continuous data loggers at 12 hydrometric stations, in five watersheds at the Mount Nansen Site were visited in the summer 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, Table 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 1993):

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

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.

2.3.9 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 24 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.

During the Q2 period, sampling occurred on a monthly basis. 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	Monthly	Standard Site Package
Pony Creek downstream	WQ-PC-D	389131	6881719	Monthly	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	Monthly	Standard Site Package
Dome Creek at DX+105	WQ-DC-DX+105	387820	6881150	Monthly	Standard Site Package
Dome Creek at D1b	WQ-DC-D1b	388264	6880989	Monthly	Standard Site Package
Upper Dome 1	WQ-DC-U1	388919	6880772	Monthly	Standard Site Package
Upper Dome 2	WQ-DC-U2	388938	6880812	Monthly	Standard Site Package
Upper Dome Creek	WQ-DC-U	389788	6880565	Monthly	Standard Site Package
Dome Creek at Road	WQ-DC-R	391111	6880449	Monthly	Standard Site Package
Tailings Pond	WQ-TP	389427	6880625	Monthly	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	Monthly	Standard Site Package
Mill Site Seep 08	WQ-MS-S-08	387954	6881073	Monthly	Standard Site Package
Adit Seep	WQ-ADIT-SEEP	389081	6881709	Monthly	Standard Site Package
Back Creek	WQ-BC	391626	6880901	Monthly	Standard Site Package
Minnesota Creek	WQ-MN	392540	6879249	Monthly	Standard Site Package
Victoria Creek Reference Site	WQ-VC-REF	391650	6881113	Monthly	Standard Site Package
Upper Victoria Creek	WQ-VC-U	391626	6880872	Monthly	Standard Site Package
Victoria Creek downstream Back Creek	WQ-VC-DBC	391633	6880740	Monthly	Standard Site Package
Victoria upstream of Minnesota	WQ-VC-UMN	392413	6879244	Monthly	Standard Site Package

Water Quality Site Name	Site ID	Site Location [1] Easting	Northing	Sampling Frequency	Parameters Included in Lab Analysis [2]
Victoria Creek at Road	WQ-VC-R	392431	6878802	Monthly	Standard Site Package
Pump House Well	WQ-PW	391558	6880856	Monthly	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 this site was variable as the WQ-SEEP site is sampled on a monthly basis for the standard package samples and every second month for the LT50 samples.

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 were taken from the same general location on the lake at three different depths: from the surface, at mid depth and just off the bottom. The boat anchor or Van Dorn sampler was 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 pit lake package (WQ-PIT), a drinking water package (WQ-PW), an LT50 package (WQ-SEEP), and a standard site package (all other sites). The parameters included in each package are outlined in Table 2-5.

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, 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.
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.

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, during each 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	-

Water Quality Parameter	CCME AL Guideline	Units	Comments
Cadmium (Cd)	0.000033	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Chloride (Cl)	120	mg/L	-
Chromium (Cr)	0.0089	mg/L	-
Copper (Cu)	0.002	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Total Cyanide	0.005	mg/L	SAD Cyanide is used as a measure of total cyanide
Fluoride (F)	0.120	mg/L	-
Iron (Fe)	0.3	mg/L	-
Lead (Pb)	0.003	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Mercury (Hg)	0.000026	mg/L	-
Molybdenum (Mo)	0.0073	mg/L	-
Nickel (Ni)	0.1	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Nitrate (N)	13	mg/L	-
Nitrite (N)	0.06	mg/L	-
pH	6.5 - 9.0	pH	-
Selenium (Se)	0.001	mg/L	-
Silver (Ag)	0.0001	mg/L	-
Thallium (Tl)	0.0008	mg/L	-
Uranium (U)	0.015	mg/L	-
Zinc (Zn)	0.03	mg/L	-

Table 2-7 Mount Nansen Effluent Quality Standards outlined in Yukon Water License #QZ94-004.

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

Water Quality Parameter	Effluent Discharge Standard
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 second 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 Q2 period (July 1, 2013 to September 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. A brief description of the meteorological conditions during the Q2 period is presented in the following sections.

3.1.1 Air and Ground Temperature

Air and ground temperatures measured at the meteorological station are illustrated in Figure F-1 and F-2, respectively in Appendix F. From inspection of the data, a minimum mean daily air temperature during the Q2 period of -3.2°C occurred on September 24, 2013. A maximum mean daily temperature of 19.7°C occurred on August 12, 2013. Mean daily air temperatures generally remained elevated from July to mid-August and then declined gradually to below 0°C in September 2013.

Mean ground temperatures generally remained above 0°C through the Q2 period, although closely approached frozen conditions by the end of September. Maximum ground temperatures occurred on August 13, 2013 with a temperature of 28.9°C. Ground temperatures remained less variable than air temperatures.

3.1.2 Precipitation

Precipitation measured as rainfall occurs sporadically at the Mount Nansen site and is illustrated in Figure F-3. Maximum daily precipitation during Q2 occurred on July 25 at 18.3 mm. Precipitation events as rainfall are dominated by short, low-intensity rainfall events most often associated with convective systems moving over the region. Daily precipitation events <6 mm are common at Mount Nansen through the summer and early fall months.

3.1.3 Wind

Wind speeds were generally low during the Q2 period, with maximum daily wind speeds occurring on September 30, 2013 with a velocity of 5.1 m/s (18 km/h). Measured wind speed and direction is illustrated in Figure F-6 and F-7 in Appendix F. Dominant wind directions at the Mount Nansen Site are south, southwest and southeast.

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. Net radiation measured at Mount Nansen is illustrated in Figure F-5. 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 increased from ~0 W/m^2 to over 500 W/m^2 in early June. During the Q2 period, net radiation peaked on July 14, 2014 at 157 w/m^2 and declined to 11.33 w/m^2 by September 29, 2013. Radiation exhibits a diurnal cycle associated with increases and decreases in received solar insolation. A tapering of net radiation fluxes occurs from peak values in June to the end of September.

3.1.5 Relative Humidity

Relative humidity at Mount Nansen generally remains above 30%, and fluctuates up to 100%. Relative humidity is presented in Figure F-2 in Appendix F. Relative humidity remains persistently variable but elevated between July 1 and September 30, 2013. Generally cooler temperature and higher relative humidity is observed into the late September period.

3.2 HYDROMETRIC RESULTS

A total of three discharge measurement events were performed between July 1, 2013 and September 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. Hydrometric data from the Q2 period is appended to the Q1 monitoring and time-series data.

Some hydrometric stations in the upper reaches of the Dome Creek watershed have either increased uncertainty or absence of discharge measurements because of limited quantities of flow at the stations. Professional judgement was used to assess the limits of stream gauging instruments and appropriate methods for low-flow conditions.

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

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

Discharge measurements were taken at H-DC-DX on July 15, 2013 and September 16, 2013 during the Q2 monitoring period. During the August 13, 2013 monitoring event, flow was absent from the channel and there was no discharge at the outlet of the culvert. Therefore, no volumetric or discharge measurements were completed for this monitoring event and discharge was considered below reportable measurement limits (<0.000 m^3/s). Since channel flows were too low for salt dilution gauging, discharge measurements for the other two monitoring events were completed using volumetric methods conducted at the culvert outlet beneath the mill road. Maximum flow at H-DC-DX during the Q2 period was measured volumetrically at 0.001 m^3/s on September 16, 2013. 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 three discharge measurements were completed at this station between July 1, 2013 and September 30, 2013. Very low discharges were encountered at the station on all visits, with minimum flows of 0.002 m^3/s. Maximum observed discharge during the Q2 period, 0.003 m^3/s, occurred on August 13, 2013.

3.2.1.3 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. Three discharge measurements were collected from H-DC-D1b: July 16, 2013 (0.001 m^3/s); August 14, 2013 (0.003 m^3/s); and September 17, 2013 (0.02 m^3/s).

3.2.1.4 H-DC-U1 and H-DC-U2

Station H-DC-U1 and H-DC-U2 were measured on each of the three monitoring events in Q2. Flows at both H-DC-U1 and H-DC-U2 were 0.002 m^3/s, 0.002 m^3/s and 0.010 m^3/s on July 15, August 13, and September 23, 2013, respectively. It is important to note that the discharges measured at H-DC-U1 and U2 cumulatively approximate flows measured upstream at H-DC-D1b.

3.2.1.5 H-DC-B

The H-DC-B station is a continuous gauging station established at the downstream end of the Dome Creek diversion channel downstream of 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 stilling 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. 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. As a result, all discharge measurements were completed using the salt dilution measurement method. Due to uncertainty associated with rating measurement points, no rating curve was developed for this station.

Station discharge measurements are presented in Appendix D. During the Q2 period, the greatest discharge was measured on September 23, 2013 at 0.02 m^3/s. Over the Q2 period, discharges were low and ranged from 0.01 m^3/s to 0.02 m^3/s. The low discharge measured at H-DC-B on each monitoring event over the Q2 period are consistent with generally dry Dome Creek watershed conditions.

3.2.1.6 H-DC-M

A continuous monitoring station operates within the middle reaches of Dome Creek at H-DC-M, downstream of the seepage pond outlet. This station is intended to measure the cumulative flow from the seepage pond outlet and the diversion channel (H-SEEP and H-DC-B). Continuous stage measurements were collected over the 2012-2013 winter period and continued into the second 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 which cover Q1 and Q2 monitoring periods (April 1 to September 30, 2013). Three additional discharge measurements were collected on July 15, August 13 and September 23, 2013. Discharge measurements ranged from 0.009 m^3/s to 0.073 m^3/s on September 23, 2013. H-DC-M stage time-series and hydrographs are presented in Appendix D (Figure D-7, D-8).

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 and subsequent measurements through Q1 and Q2 of 2013. Table 3-1 summarizes the rating curve expressions presented for the 2012-2013 report and revised rating curve for the 2013 Q2 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 September, 2013				
1.550	0.00124	1.52	-	-
1.891	0.771	1.52	2.558	$Q=9.74\ (h-1.52)^{2.56}$

3.2.1.7 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 second quarter of 2013. Maximum discharge measured was 0.085 m^3/s on September 23, 2013. Minimum discharge measured was 0.012 m^3/s on August 13, 2013. The rating curve developed for the H-DC-R remains unchanged from the first quarter of 2013. The original 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 September, 2013				
0.274	0.002	0.125	-	-
1.062	0.477	0.125	2.98	$Q = 0.579\ (h - 0.125)^{2.98}$

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; therefore, all other discharge measurements were made using the salt dilution method.

Three discharge measurements were collected during the Q2 period on July 16, August 14 and September 24, 2013. The greatest discharge measured during Q2 was 0.053 m^3/s on September 24, 2013. Previously reported rating curves in the Q1 report were revised and updated using the additional discharge measurements and are presented in Table 3-3. Time-series water stage and hydrographs are presented in Appendix D (Figure D-2 and Figure D-3).

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

Stage (m)	Discharge (m3/s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013				
1.630	0.001	1.62	-----	-----
1.893	0.063	1.62	1.252	$Q = 0.319\ (h\text{-}1.62)^{1.252}$
2.168	0.602	1.62	3.244	$Q = 4.239\ (h\text{-}1.62)^{3.244}$
Revised Rating Curve, April, 2013 to September, 2013				
1.63	0.001	1.49	-	-
2.168	0.602	1.49	4.057	$Q = 2.91\ (h - 1.49)^{4.06}$

3.2.3 Minnesota Creek Watershed

3.2.3.1 Minnesota Creek (H-MN)

The station on Minnesota Creek was re-established on May 23, 2013. Three discharge measurements were completed at the station during the Q2 monitoring period, on July 16, 2013 using the salt dilution method and on August 14 and September 24, 2013 using the ADV for the mid-section velocity method.

The Minnesota Creek channel is well defined with nearly vertical banks near the station and a cobble/gravel bed. The channel averages 1.12 m in width and 0.41 m in depth. Maximum discharge recorded during spring freshet was 0.443 m^3/s, while maximum discharge during the Q2 period was 0.123 m^3/s on September 24, 2013.

Preliminary rating curves for H-MN are presented in Table 3-4 in addition to the previously developed rating curves from the 2012-2013 monitoring period. Rating measurements collected during Q2 were appended to the data set and used to revise the station rating curve. 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. Time-series water stage and hydrographs are presented in Appendix D (Figure D-15, D-16).

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 September, 2013				
0.917	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. Three discharge measurements were made on each site visit during the Q2 monitoring period using the velocity-area method (*i.e.,* ADV). Maximum measured discharge during Q2 was 0.750 m^3/s on September 24, 2013 while minimum discharge measured was 0.108 m^3/s on July 16, 2013.

The rating curve for the H-VC-REF station was updated using the three additional rating measurements collected during Q2. The preliminary rating curve equations for the station are presented in Table 3-5, in

addition to rating curve expressions used for the 2013-2013 monitoring period. Time-series stage and hydrograph data is presented in Appendix D (Figure D-17, D-18). Based on the station hydrograph, a high-flow event associated with spring freshet occurred on May 27, 2013. A subsequent precipitation-induced high flow event occurred on July 22, 2013 at 1.38 m^3/s. Mean discharge between the beginning of the Q1 monitoring period and end of Q2 period was 0.511 m^3/s.

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 September, 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 monitored stage elevations downstream of H-VC-REF, approximately 65 metres upstream of the Back Creek confluence. The station is known to receive groundwater contributions indicated by thin ice cover during the winter period. Three discharge measurements were collected during the Q2 period using the velocity-area method. Each of the discharge measurements were used to update the rating curves previously reported for the Q1 period. The 2012-2013 rating curves and revised rating curve expressions for the Q2 period are presented in Table 3-6.

The discharge measured was 0.115 m^3/s on July 16, 2013; 0.278 m^3/s on August 24, 2013; and 0.741 m^3/s on September 23, 2013. Continuous stage records and time-series hydrographs for April 1, 2013 through September 30, 2013 are presented in Appendix D (Figure D-19, D-20). Based on these records, precipitation-induced peak discharges occurred on July 22, 2013 and July 26, 2013. According to hydrographs created for H-VC-U, maximum discharge over the Q1 and Q2 monitoring period was 7.977 m^3/s (May 27, 2013), with mean discharge of 0.653 m^3/s between April 1, 2013 and September 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 September, 2013				

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
2.011	0.068	1.90		
2.650	8.50	1.90	2.55	$Q = 18.95 (h - 1.90)^{2.55}$

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

The continuous gauging station H-VC-DBC was visited three times during the Q2 period. The channel had an average width of 4.8 m and a depth 0.25 m at the discharge measurement location. All measurements in the Q2 period were collected using the ADV method. Discharge measurements were taken on July 16, 2013; August 14, 2013; and September 24, 2013. Maximum discharge measured during the Q2 period was 0.785 m^3/s on September 24, 2013. Based on continuous measurements collected from the station, precipitation-inducted peak discharges occurred on July 22, 2013 at a maximum discharge of 2.73 m^3/s. Mean discharge between April 1, 2013 and September 30, 2013 at H-VC-DBC was 0.687 m^3/s.

Continuous stage measurements and hydrograph is presented in Appendix D (Figure D-21, D-22). 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 September, 2013				
1.782	0.06405	1.67		
2.586	10.61813	1.67	1.829	$Q = 12.5 (h - 1.67)^{1.83}$

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 averages 5.7 m in width and 0.20 m in depth, with channel conditions suitable for standard discharge measurement methods using the ADV. Three discharge measurements were collected during the Q2 monitoring period. Measured discharge was 0.126 m^3/s on July 16, 2013; 0.321 m^3/s on August 14, 2013; and 0.783 m^3/s on September 24, 2013.

Rating curve expressions were updated and revised using the additional three rating measurements at the H-VC-UMN station. Rating curve expressions for H-VC-UMN are presented in Table 3-8 and include previously reported rating curve expressions for the 2012-2013 monitoring period.

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	$Q = 4.63406\ (h\text{-}0.979)^{6.03671}$
1.954	3.684	0.979	5.647	$Q = 4.25022\ (h\text{-}0.979)^{5.64705}$
2.140	9.980	0.979	5.708	$Q = 4.25676\ (h\text{-}0.979)^{5.70783}$
Revised Rating Curve, April, 2013 to September, 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 9.909 m^3/s. Average discharge between April 1, 2013 and September 30, 2013 at 0.797 m^3/s. The continuous stage and hydrograph records for H-VC-UMN are found in Appendix D (Figure D-23, D-24).

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. Channel widths average 6.7 m and 0.25 m in depth at the discharge measurement location. Three discharge measurements were collected during the Q2 monitoring period using the ADV. Maximum discharge measured in the Q2 monitoring period was 0.949 m^3/s on September 23, 2013. Each of the additional rating measurements were used to append to the rating curve previously reported in the Q1 monitoring report. Rating curve expressions for the H-VC-R station are presented in Table 3-9 in addition to the 2012-2013 monitoring period rating curve expressions.

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 September, 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 (Figure D-25, D-26). According to the continuous record, precipitation-driven peak discharge events occurred in the Q2 period on July 22, 2013 (2.39 m^3/s) and July 26, 2013 (2.10 m^3/s). Mean discharge between April 1, 2013 and September 30, 2013 is 0.905 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.

Three discharge measurements were collected at H-PC-U between June 1 and September 30, 2013. Discharge measurements were below reportable detection limits (<0.001 m^3/s) on July 15, 2013; 0.002 m^3/s on August 13, 2013; and 0.009 m^3/s on September 23, 2013.

No rating curves exist for the H-PC-U station apart from the weir structure that no longer has water flowing through it. This is due to the channel morphology and limited confidence in the rating discharge measurements to produce a robust estimate using a rating curve expression. Therefore, only continuous stage elevations and instantaneous discharge measurements are presented in Appendix D (Figure D-3, D-4).

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 Back 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 and volumetric methods are 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. Three discharge measurements were taken between June 1, 2013 and September 30, 2013. Measured discharge was below reportable measurement limits on July 16, 2013 and August 13, 2013 (<0.001 m^3/s), while discharge measured on September 23, 2013 was 0.005 m^3/s.

Due to the limited number of rating measurements and accuracy of the data, no rating curve was developed for the H-PC-DSP station. Continuous time-series stage elevations and instantaneous discharge measurements are presented in Appendix D (Figure D-6, D-7).

3.3 WATER QUALITY RESULTS

Water quality results for sampling within the Q2 period are discussed on a 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 parameters. 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 during the Q2 period. Numerous CCME guideline and/or Mount Nansen EQS exceedances were found in Dome Creek for TSS, F, Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Mn, and Zn. 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 and Zn frequently exceeded both the CCME and EQS values. These results are similar to results from Q1. 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 CCME exceedance for the Hg guideline was only found at the WQ-DC-DX on one occasion (July 15-17, 2013 sampling event), this was similar to the results from the Q1 period. There were no cyanide exceedances during the Q2 investigation period.

A summary of *in situ* water quality parameters for the Dome Creek sites are provided in Table 3-12. In general water temperatures had increased from July to August, and then decreased from August to September as water temperatures dropped down to between 0.5 °C and 2.4 °C. Specific conductivity showed a decreasing trend from July to September at all sites. Other parameters fluctuated from month to month (pH and turbidity).

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 the Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-DC-DX	WQ-DC-DX+105	WQ-DC-D1b	WQ-DC-U1
July 15-17, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg	Al, As, Cd, Mn, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	Al, As, Cd, Fe
Aug 13-15, 2013	Al, As, Cd, Fe, Mn	F, As, Cd, Mn, Zn	F, Al, As, Cd, Fe, Pb, Mn, Zn	Al, As, Cd, Fe
Sep 23-25, 2013	Al, Cd, Fe	Al, As, Cd, Mn, Zn	Al, As, Cd, Fe, Pb, Mn, Zn	Al, As, Cd, Fe

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 Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-DC-U2	WQ-DC-U	WQ-DC-R
July 15-17, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	Al, As, Cd, Cu, Fe, Mn	Al, As, Cd, Fe, Pb, Mn
Aug 13-15, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	Al, As, Cd, Cu, Fe, Mn	F, Al, As, Cd, Fe, Mn

Sampling Trip Date	WQ-DC-U2	WQ-DC-U	WQ-DC-R
Sep 23-25, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn	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 Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)[1]
WQ-DC-D1b	16-Jul-13	7.0	1462.0	7.89	17.2
WQ-DC-D1b	14-Aug-13	10.5	1433.0	8.10	8.01
WQ-DC-D1b	24-Sep-13	1.5	1235.0	7.61	2.84
WQ-DC-DX	17-Jul-13	3.8	873.0	7.11	109.0
WQ-DC-DX	14-Aug-13	5.3	476.1	7.55	39.3
WQ-DC-DX	24-Sep-13	1.2	472.4	7.65	2.82
WQ-DC-DX+105	16-Jul-13	0.8	1239.0	6.95	2.42
WQ-DC-DX+105	14-Aug-13	0.8	1227.0	7.06	3.11
WQ-DC-DX+105	24-Sep-13	0.8	929.3	6.93	1.95
WQ-DC-R	16-Jul-13	9.1	1242.0	7.65	43.9
WQ-DC-R	14-Aug-13	7.3	1168.0	7.73	49.3
WQ-DC-R	24-Sep-13	0.5	731.7	7.21	25.7
WQ-DC-U	16-Jul-13	14.2	1386.0	7.97	30.7
WQ-DC-U	14-Aug-13	13.2	1361.0	8.06	22.8
WQ-DC-U	24-Sep-13	2.4	850.9	7.40	25.2
WQ-DC-U1	16-Jul-13	6.9	1227.0	7.53	6.96
WQ-DC-U1	14-Aug-13	9.7	1262.0	7.86	2.03
WQ-DC-U1	24-Sep-13	1.1	811.7	7.61	0.71
WQ-DC-U2	16-Jul-13	6.4	1256.0	7.71	51.2
WQ-DC-U2	14-Aug-13	8.6	1181.0	7.77	60.3
WQ-DC-U2	24-Sep-13	1.3	942	7.40	36.8

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.2 Brown-McDade Pit Lake

The Brown-McDade pit lake was sampled on three events during the Q2 investigation period. During the July 15-17, 2013 and August 13-15, 2103 visits the lake was sampled from the surface, at mid-depth (2.5 m) and just off the bottom (5 m). During the September 23-25, 2013 sampling event, samples were taken from surface, at mid-depth (3 m), and just off the bottom (6 m). Note sampling depths for the mid-depth and bottom samples 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.

During the July 2013 trip, all three samples exceeded the CCME guidelines for Al, As, Cd, and Cu with the addition of F in the surface and mid-depth sample and the addition of Pb in the bottom sample (Table 3-13; Appendix E). Zn exceeded the EQS at all sample depths. During the August 2013 trip, all samples had CCME exceedances of F, Al, As, Cd, Cu, and Zn, with one middle sample for Zn also exceeding the EQS. For the September 2013 trip, the surface and bottom sample had exceedances of F, Al, As, Cd, Cu, Pb and Zn while the mid-depth sample had only exceedances in F, Al, As, Cd, and Cu. The Zn concentrations in the bottom sample exceeded both the CCME and EQS. See Table 3-14 for a summary of *in situ* water quality parameters. Water temperatures in the pit lake were highest during the August 2013 trip, reaching a maximum of 15.3 °C. During the September 2013 trip temperatures were between 5.2 °C and 6.8 °C. Specific conductivity was highest typically from the bottom sample depth (WQ-PIT-3) and dissolved oxygen was lowest from this depth.

Table 3-13. Summary of parameters that exceeded CCME guidelines for the Brown McDade Pit Lake for each sampling depth for the Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-PIT-1 (surface)	WQ-PIT-2 (mid-depth)	WQ-PIT-3 (bottom)
Jul 15-17, 2013	F, Al, As, Cd, Cu, Zn	F, Al, As, Cd, Cu, Zn	Al, As, Cd, Cu, Pb, Zn
Aug 13-15, 2013	F, Al, As, Cd, Cu, Zn	F, Al, As, Cd, Cu, Zn	F, Al, As, Cd, Cu, Zn
Sep 23-25, 2013	F, Al, As, Cd, Cu, Pb, Zn	F, Al, As, Cd, Cu	F, Al, As, Cd, Cu, Pb, Zn

Table 3-14. *In-situ* water quality data for the Brown McDade Pit Lake for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Sample Depth (m)	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)	Dissolved Oxygen[2] (mg/L)
WQ-PIT-1	17-Jul-13	0.3	13.0	1547	7.96	0.28	8.27
WQ-PIT-1	14-Aug-13	0.3	15.3	1610	8.13	2.79	-
WQ-PIT-1	24-Sep-13	0.3	5.2	1694	7.73	0.73	10.16
WQ-PIT-2	17-Jul-13	2.5	12.8	1552	7.95	0.36	8.43
WQ-PIT-2	14-Aug-13	2.5	14.0	1606	7.20	0.79	-
WQ-PIT-2	24-Sep-13	3.0	5.6	1810	6.96	0.65	9.44
WQ-PIT-3	17-Jul-13	5.0	11.0	2462	7.00	1.19	7.56
WQ-PIT-3	14-Aug-13	5.0	14.7	1295	8.02	1.23	-
WQ-PIT-3	24-Sep-13	6.0	6.8	2664	6.66	0.63	5.98

[1] Turbidity was not measured *in situ* during the July and September 2013 trips due to equipment malfunctions (values are from the lab).
[2] Dissolved oxygen for the August trip was not measured accurately.

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 Q2 investigation period. The WQ-TP site consistently exceeded CCME and/or EQS for Al, As, Cd, Cu, Pb, and Zn, in addition to F and Fe on a few occasions (Table 3-15; Appendix E). The WQ-SEEP site consistently had exceedances for Al, As, Cd, Cu, Fe, and Mn, which is consistent with the Q1 period. LT50

analysis at the WQ-SEEP site was scheduled on a bi-monthly basis, and during the Q2 period, two LT50 samples were collected (July 2013 and September 2013). All LT50 tests passed the 96-hr rainbow trout acute toxicity test (LT50 >96 hrs in all cases); no toxicity for rainbow trout was detected. All exceedances for WQ-TP and WQ-SEEP were based on the CCME guidelines; however, Fe frequently exceeded both the CCME and EQS values.

The WQ-MS-S-03 mill seep was sampled during all site visits during the Q2 period. The site consistently exceeded guidelines and/or standards for As, Cd, Fe, Mn and Zn, as well as TSS, F, Al, Cu, and Pb on some occasions (Table 3-15; Appendix E). 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.

The WQ-MS-S-08 mill seep was only sampled on the August 2013 trip, as it was found to be dry on the other trips. The August samples exceeded the CCME guidelines for Al, As, Cd, Pb, Zn, the EQS for Mn, and both the CCME guideline and EQS for Fe (Table 3-15; Appendix E).

In situ water quality parameters for each trip and each site are summarized in Table 3-16. Water temperatures recorded in the tailings pond reached a high of 18.8 °C on the August 2013 trip and a low of 3.9 °C on the September 2013 trip. Water temperatures from the WQ-SEEP site were around 9 °C during the July and August 2013 trips, and dropped down to 3.4 °C by the September 2013 trip. Temperatures at the mill seep sites were relatively low during all visits, compared to other sites, as they originate from groundwater sources beneath the mill.

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 Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-TP	WQ-SEEP	WQ-MS-S-03	WQ- MS-S-08
July 15-17, 2013	Al, As, Cd, Cu, Pb, Zn	Al, As, Cd, Cu, Fe, Mn	TSS, Al, As, Cd, Cu, Fe, Pb, Mn, Zn	-
Aug 13-15, 2013	F, Al, As, Cd, Cu, Pb, Zn	Al, As, Cd, Cu, Fe, Mn	F, As, Cd, Fe, Mn, Zn	Al, As, Cd, Fe, Pb, Mn, Zn
Sep 23-25, 2013	F, Al, As, Cd, Cu, Fe, Pb, Zn	Al, As, Cd, Cu, Fe, Mn	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	-

Table 3-16. *In situ* water quality data for WQ-TP, WQ-SEEP and WQ-MS-S-03 for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-SEEP	16-Jul-13	9.4	1672	6.9	87.8
WQ-SEEP	14-Aug-13	9.2	1717	7.39	54.7
WQ-SEEP	24-Sep-13	3.4	1621	6.93	101
WQ-TP	16-Jul-13	17.5	1254	8.38	4.44

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-TP	14-Aug-13	18.8	1309	8.53	4.38
WQ-TP	24-Sep-13	3.9	1273	7.73	3.12
WQ-MS-S-03	16-Jul-13	5.6	1256	7.32	26.20
WQ-MS-S-03	14-Aug-13	2.9	1264	7.04	5.62
WQ-MS-S-03	24-Sep-13	1.3	1173	7.16	28.70
WQ-MS-S-08	14-Aug-13	2.5	1591	7.42	4.12

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.4 Victoria Creek

Victoria Creek was sampled at five sites throughout the watershed. All sites were sampled on all trips of the Q2 investigation period. All sites had CCME guideline exceedances for Al and Cd, which is consistent with the Q1 period. The WQ-VC-R site also had CCME guideline exceedances for Fe, in addition to Cu on the September 23-25, 2013 trip. The other Victoria Creek sites also had CCME exceedances for Fe on the September 23-25, 2013 trip. See Table 3-17 and Appendix E for a summary of exceedances for each trip. *In situ* water quality parameters for each trip are summarized in Table 3-18. Water temperatures and specific conductivity at all Victoria Creek sites consistently decreased from July 2013 to September 2013.

Table 3-17. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for sites within the Victoria Creek watershed for the Q2 period (July 1 to September 30, 2013).

Sampling Trip Dates	WQ-VC-REF	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R
July 15-17, 2013	Al, Cd	Al, Cd	Al, Cd	Al, Cd	Al, Cd, Fe
Aug 13-15, 2013	Al, Cd	Al, Cd	Al, Cd	Al, Cd	Al, Cd, Fe
Sep 23-25, 2013	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Cu, Fe

Table 3-18. *In situ* water quality data for sites within the Victoria Creek watershed for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-VC-DBC	16-Jul-13	7.6	213.3	7.67	1.62
WQ-VC-DBC	14-Aug-13	6.0	194.2	7.77	1.78
WQ-VC-DBC	24-Sep-13	1.4	150.5	7.34	1.59
WQ-VC-R	16-Jul-13	7.5	270.3	7.38	2.41
WQ-VC-R	14-Aug-13	6.9	221.4	7.97	4.13
WQ-VC-R	24-Sep-13	1.0	159.8	8.2	2.43
WQ-VC-REF	16-Jul-13	10.6	208.3	7.74	1.07

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-VC-REF	14-Aug-13	7.3	185.3	7.3	1.59
WQ-VC-REF	24-Sep-13	1.9	136.9	7.42	2.14
WQ-VC-U	16-Jul-13	7.5	206.1	7.52	0.75
WQ-VC-U	14-Aug-13	6.0	187.6	7.74	1.68
WQ-VC-U	24-Sep-13	1.4	138.6	7.38	2.56
WQ-VC-UMN	16-Jul-13	8.0	288.8	7.68	1.88
WQ-VC-UMN	14-Aug-13	6.6	238.8	7.88	3.21
WQ-VC-UMN	24-Sep-13	1.2	180.0	7.42	2.48

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.5 Back Creek

The Back Creek site was sampled during all trips of the Q2 period. Each trip consistently had CCME guideline exceedances for Al and Cd, in addition to Cu and Fe in the September samples (Table 3-19; Appendix E). The site EQS for Mn was also exceeded on the July 2013 and August 2013 trips. See Table 3-20 for a summary of *in situ* water quality results. During the Q2 period, water temperatures decreased from 14.8 °C in July 2013 to 2.3 °C in September 2013. Specific conductivity in Back Creek also decreased consistently from July through to September. Turbidity remained relatively low at the site during the Q2 period, whereas in previous years a placer operation upstream has typically caused high turbidity during the summer months.

Table 3-19. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for WQ-BC for the Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-BC
July 15-17, 2013	Al, Cd, Mn
Aug 13-15, 2013	Al, Cd, Mn
Sep 23-25, 2013	Al, Cd, Cu, Fe

Table 3-20. I*n situ* water quality data for WQ-BC for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-BC	16-Jul-13	14.8	342.6	8.25	0.65
WQ-BC	14-Aug-13	9.3	336.8	8.31	1.41
WQ-BC	24-Sep-13	2.3	270.5	7.67	3.03

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.6 Minnesota Creek

Minnesota Creek was sampled on all trips over the Q2 period. Lab analysis results showed that all samples consistently exceeded the CCME guidelines for Al, Cd, and Cu and exceeded both the CCME guideline and EQS for Fe (Table 3-21; Appendix E). *In situ* water quality parameters for each trip are summarized in

Table 3-22. Water temperatures had noticeably dropped off during the September 2013 trip reaching a low of 0.6 °C. Specific conductivity in Minnesota Creek also decreased consistently from July through to September.

Table 3-21. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for WQ-MN for the Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-MN
July 15-17, 2013	Al, Cd, Cu, Fe
Aug 13-15, 2013	Al, Cd, Cu, Fe
Sep 23-25, 2013	Al, Cd, Cu, Fe

Table 3-22. *In situ* water quality data for WQ-MN for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-MN	16-Jul-13	5.3	110.6	7.26	9.53
WQ-MN	14-Aug-13	5.3	85.2	7.89	15.4
WQ-MN	24-Sep-13	0.6	51.8	7.65	5.25

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.7 Pony Creek & Adit Seep

Pony Creek was sampled at two sites, WQ-PC-D and WQ-PC-U during all trips of the Q2 period. The WQ-ADIT-SEEP site was not sampled during the Q2 period because the site was dry during all visits. The WQ-PC-U site had CCME guideline exceedances for Al and Cd on all trips, in addition to As, Fe and Mn on the July 15-17, 2013 trip (Table 3-23; Appendix E). Note Fe exceeded both the CCME guideline and EQS value for the July trip, while Mn exceeded the EQS value. The downstream site had guideline and/or standard exceedances for Al, As, Cd, Cu and Zn on all trips, in addition to Fe on the July 2013 trip and Pb on the July and August trips. The downstream site typically has a higher incidence of elevated metal concentrations than the upstream site, due to the fact that the lower portion of Pony Creek was historically covered by a waste rock pile during the period when the mine was active.

In situ water quality parameters for each trip are summarized in Table 3-24. Water temperatures had noticeably decreased from the July 2013 and August 2013 trips to the September 2013 trip, to between

0.6 °C and 1.3 °C. Specific conductivity in Pony Creek also decreased consistently from July through to September at both sites.

Table 3-23. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen for sites within the Pony Creek watershed for the Q2 period (July 1 to September 30, 2013).

Sampling Trip Date	WQ-PC-U	WQ-PC-D
July 15-17, 2013	Al, As, Cd, Fe, Mn	Al, As, Cd, Cu, Fe, Pb, Zn
Aug 13-15, 2013	Al, Cd	Al, As, Cd, Cu, Pb, Zn
Sep 23-25, 2013	Al, Cd	Al, As, Cd, Cu, Zn

Table 3-24. *In situ* water quality data for sites within the Pony Creek watershed for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-PC-D	16-Jul-13	6.9	592.8	6.79	2.82
WQ-PC-D	14-Aug-13	7.1	482.3	7.25	0.95
WQ-PC-D	24-Sep-13	1.3	277.6	7.31	0.37
WQ-PC-U	16-Jul-13	7.1	468.5	6.45	1.68
WQ-PC-U	14-Aug-13	8.3	376.0	7.40	4.57
WQ-PC-U	24-Sep-13	0.6	238.3	7.30	0.75

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.8 Pump House Well

The pump house well was sampled during every visit of the Q2 period. Both bacteriological samples and drinking water package samples were collected. The bacteriological sample collected during the August 2013 trip could not be submitted for analysis due to exceedance of the holding time, as the sample returned to Whitehorse on a Friday and the lab does not accept samples on Fridays. For the July 2013 and September 2013 samples total coliforms and E. coli were found to be absent. Chemical analysis of drinking water samples took place on April 17, 2013, June 12, 2013, and May 29, 2013. Chemical analysis of the drinking water package samples found no exceedances. *In situ* water quality parameters for each trip are summarized in Table 3-25.

Table 3-25. *In situ* water quality data for WQ-PW for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-PW	17-Jul-13	2.6	426.1	7.40	<0.10
WQ-PW	15-Aug-13	1.4	370.9	7.90	0.33
WQ-PW	25-Sep-13	2.0	394.4	8.20	<0.10

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.9 Dry Creek Reference Site

The Dry Creek reference site was sampled on the July 2013 and September 2013 trips, to represent the summer and fall reference samples. Both Al and Fe exceeded the CCME guideline values on both trips; in addition to Cd on the July trip (Appendix E). *In situ* water quality parameters for each trip are summarized in Table 3-26.

Table 3-26. *In situ* water quality data for WQ-DRY for the Q2 period (July 1 to September 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity[1] (NTU)
WQ-DRY	17-Jul-13	2.2	377.4	7.37	0.54
WQ-DRY	24-Sep-13	0.6	348.5	7.55	0.59

[1] Turbidity could not be measured *in situ* during the July 2013 and September 2013 trip due to equipment malfunctions, and thus turbidity was measured by the lab.

3.3.10 QA/QC Program

Field blank and travel blank samples were included on every trip during the Q2 period. Two duplicate samples were also collected during each sampling event. Table 3-27 summarizes the sample trip dates and sites where duplicate samples were collected.

All field blank and travel blank samples showed no contamination 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 (Appendix E). Many of the duplicate sites had either relatively high TSS and/or large differences in TSS values within the duplicate sample set. These factors can lead to variability in metal concentrations as many metals bind more readily to sediment particles. See Appendix E for parameters that were flagged as greater than +/-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
July 15-17, 2013	WQ-MN-r	WQ-DC-U-r
Aug 13-15, 2013	WQ-SEEP-r	WQ-MS-S-03-r
Sep 23-25, 2013	WQ-PC-D-r	WQ-SEEP-r

4 RECOMMENDATIONS

Based on results of the Q2 period of the Mount Nansen Water Resources Investigations Program from July 1, 2013 to September 30, 2013, EDI recommends that monitoring should continue as scheduled with added consideration of several recommendations outlined below. These recommendations attempt to improve the overall program data quality and efficiency.

- Hydrometric stations at U1 and 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.

- We recommend relocating the weir structure currently deployed at H-PC-U station to H-DC-DX+105. H-DC-DX+105 is located where the channel remains nearly ice-free over the winter period. The weir may function throughout the winter low-flow period and provide more robust station discharge data compared to salt tracer methods currently used.

- Remove the WQ-ADIT-SEEP site from the monitoring program for the Q3 and Q4 period. The seep has not been active from June 2013 to September 2013, and it is very unlikely that it will be active in either of the following quarters as water levels drop across the Mount Nansen Site for the winter months (November – March). If surface water is observed during the spring freshet of 2014 (May/June 2014), a one-time sample may be warranted to verify the water chemistry; however, it remains the opinion of EDI that when there is flow at the WQ-ADIT-SEEP location, it is likely a branch of flow from Pony Creek, present during high flows (EDI 2013a).

- Remove the WQ-MS-S-08 mill seep site from the monitoring program for the Q3 and Q4 periods, as it is unlikely to be active since it has appeared only during higher flows on site. The site can be monitored again starting in the spring of 2014, and if seepage water is identified as visible and flowing in the vicinity of WQ-MS-S-08, occasional samples may be collected to verify the seepage water chemistry.

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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.

APPENDIX A Q2 SITE AND STATION PHOTOGRAPHS

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Dome Creek Sites/Stations

Photo 1. H/WQ-DC-DX (looking downstream).

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 downstream).

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

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

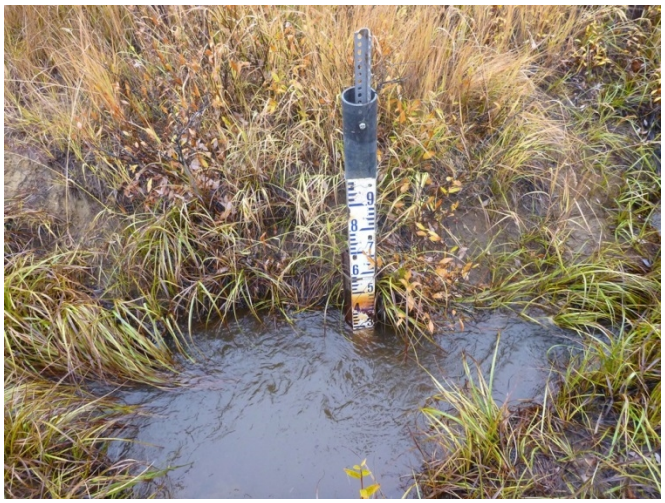

Photo 8. H-DC-R (looking across to left downstream bank)

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

Victoria Creek Sites/Stations

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

Photo 2. H-VC-U (looking upstream).

Photo 3. WQ-VC-U (looking downstream).

Photo 4. H-VC-DBC (looking upstream).

Photo 5. WQ-VC-DBC (looking downstream).

Photo 6. H/WQ-VC-UMN (looking upstream).

Photo 7. H-VC-R (looking upstream).

Photo 8. WQ-VC-R site (looking downstream).

Pit Lake/Tailings Pond/Seep Sites

Photo 1. H/WQ-SEEP (looking downstream).

Photo 2. WQ-PIT.

Photo 3. WQ-MS-S-03 (looking upstream).

Photo 4. WQ-MS-S-08 (looking downstream).

Photo 5. WQ-TP.

Pony Creek Sites/Stations

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

Photo 2. WQ-PC-U (looking upstream).

Photo 3. H-PC-DSP (staff gauge).

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

Minnesota Creek and Back Creek

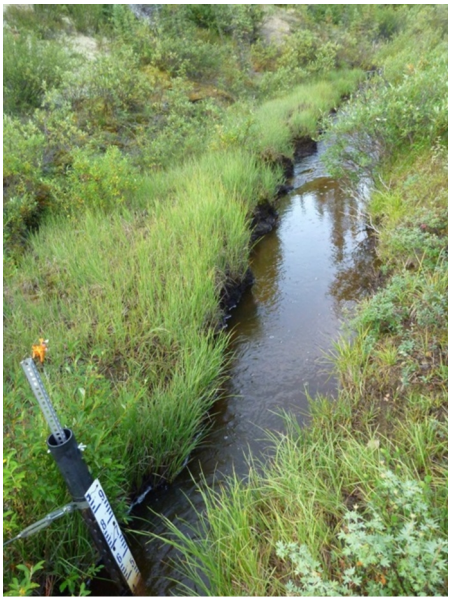

Photo 1. H-MN (looking downstream).

Photo 2. WQ-MN (looking across, left downstream bank).

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

Dry Creek Reference Site & Pump House Well Site

Photo 1. WQ-DRY (looking downstream).

Photo 2. WQ-PW.

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APPENDIX B Q2 MONITORING VISIT RECORD

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Table B-1. Record of sites sampled and stations monitored during each site visit during the Q2 period, July 1 to September 30, 2013.

Station/Site Name	July 15-17, 2013	August 13-15, 2013	September 23-25, 2013
H-PC-U/WQ-PC-U	Y	Y	Y
H-PC-DSP/WQ-PC-D	Y	Y	Y
H-DC-DX/WQ-DC-DX	Y	Y	Y
H-DC-DX+105/WQ-DC-DX+105	Y	Y	Y
H-DC-D1/WQ-DC-D1	Y	Y	Y
H-DC-D1b/WQ-DC-D1b	Y	Y	Y
H-DC-U1/WQ-DC-U1	Y	Y	Y
H-DC-U2/WQ-DC-U2	Y	Y	Y
H-DC-B	Y	Y	Y
H-DC-M/WQ-DC-U	Y	Y	Y
H-DC-R/WQ-DC-R	Y	Y	Y
H-SEEP/WQ-SEEP	Y	Y	Y
H-TP/WQ-TP	Y	Y	Y
WQ-PIT-1,2,3	Y	Y	Y
WQ-MS-S-03	Y	Y	Y
WQ-MS-S-08	N	Y	N
WQ-ADIT-SEEP	N	N	N
H-BC/WQ-BC	Y	Y	Y
H-MN/WQ-MN	Y	Y	Y
H-VC-REF/WQ-VC-REF	Y	Y	Y
H-VC-U/WQ-VC-U	Y	Y	Y
H-VC-DBC/WQ-VC-DBC	Y	Y	Y
H-VC-UMN/WQ-VC-UMN	Y	Y	Y
H-VC-R/WQ-VC-R	Y	Y	Y
WQ-PW	Y	Y	Y
WQ-DRY	Y	N	Y

Codes

N – site or station not sampled due to no observations of flow
Y – water sampling conducted and/or discharge measurement collected

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APPENDIX C Q2 EDI FIELD DATA SHEETS

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Project #: 13-7-0167
Project Name: Mt Klappan

Weather: partly cloudy, light wind, 25°C

HID	H-DCM	Date	15 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek Middle	Q Measurement Start Time:	14:25 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	14:45 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	14:16 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.28016 [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 10500188	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0047	[D/S] 0048	[RDB] 0049	[LDB] 0050	[STAFF/WEIR] 0051

Site Comments

- logger shift between survey circuits, installing logger bolt - previously wire.
- 1st survey with wire, 2nd survey with bolt
- well silted.
- logger reading -0.2463 @14:45 (after logger shift)

Channel Measurements

	old	new
Staff Gauge Height (m):	0.167	0.150
Weir Head (m):		
Water Temperature (°C):	15.2	
Water Surface Slope (%):		
Average Width (m):		
Average Depth (m):		

Measurement Summary	Primary	Secondary
Meas. Type:	~~SS~~	
Measurment ID (MID):	815	
Average Q (m^3/s):	~~1.46x10^{-5}~~	~~9.4x10^{-3}~~
Q Meas. Accuracy +/- [%]:	23%	2.2x10^{-3}
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 (14:25)	1405 | 1587	44	0.100	20	.005
2 (14:35)	1407 | 1590	44	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	1405 / 14.9 °C
CF.T =	9.46×10^{-5}
Qsalt =	0.0094

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	1447	14.9
2.	20	1481	14.9
3.	20	1510	14.9
4.	20	1543	14.9
5.	20	1571	14.9
6.	20	1597	14.9
7.	20	1624	14.9
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) 14:30 — 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	old	new
Station	A	B	C		Station	A	B	C			
BM1	4.341	1.341	3.000		BM1	4.355	1.355	3.000	Log'r Rod Length:	1.165	
BM2		2.016	2.325	∅	BM2		2.030	2.325	Log'r Rod to Botm:	1.055	1.255
BM3		1.619	2.722	∅	BM3		1.633	2.722			
TOS		1.879	2.462		TOS		1.878	2.477			
WATER		1.652	2.689		WATER		1.648	2.707			
LOG'R ROD:		2.713	1.628		LOG'R ROD:		2.731	1.624			
HWM					HWM						
BANKFULL					BANKFULL						
BS (BM1)		1.341	3.000		BS (BM1)		1.355	3.000			

taken from line above

Before shift w wire fastener

after shift w bolt fastener

Field Staff: BS, DS, JM
Data Entry By: CL — Date: 5 AUG 2013
Reviewed By: — Date:

Project #: 13-Y-0167
Project Name: Mt Klappan

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: mostly cloudy, mod. wind, ~22°C

HID	H-DCB	Date	15-JULY-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek @ Bridge	Q Measurement Start Time:	15:21 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	15:44 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	15:27 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [downloaded]	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 99081514	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 0062	[D/S] 0063	[RDB] 0065	[LDB] 0064	[STAFF/WEIR] 0066	

Site Comments

- logger dry + silted up
- staff + logger shift between 1st + 2nd survey

Channel Measurements (old | new)

	old	new
Staff Gauge Height (m):	0.088	0.101
Weir Head (m):		
Water Temperature (°C):	15.2	
Water Surface Slope (%):		
Average Width (m):		
Average Depth (m):		

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	816	
Average Q (m^3/s):	1.58×10^{-2}	
Q Meas. Accuracy +/- [%]:	29	
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_B (kg)	Volume (L)	Css (kg/L)
1 (15:21)	1383 | 1447	44	.050	20	.025
2 (15:34)	1375 | 1442	44	.050	20	
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	400
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1389 | 15.9 °C
CF.T =	2.09×10^{-4}
Qsalt =	0.0158

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	10	1398	15.9
2.	10	1415	15.8
3.	10	1428	15.9
4.	10	1435	15.9
5.	10	1453	15.9
6.	10	1465	15.9
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) =		

↑ silt cleaned before measurement

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER) 15:38 — 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	old	new
Station	A	B	C		Station	A	B	C			
BM1	3.783	0.783	3.000		BM1	3.856	0.856	3.000	Log'r Rod Length:	1.459	
BM2		0.426	3.337		BM2		0.861	2.995	Log'r Rod to Botm:	1.383	1.531
BM3		0.788	2.995		BM3		0.499	3.357			
TOS		1.432	2.351		TOS		1.511	2.345			
WATER		0.849	2.934		WATER		0.998	2.858			
LOG'R ROD:		2.351	1.432		LOG'R ROD:		2.410	1.446			
HWM					HWM						
BANKFULL					BANKFULL						
BS (BM1)		0.783	3.000		BS (BM1)		0.856	3.000			

Field Staff: BSm, JM, DS
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt Klappan

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: partly cloudy, mod. wind, ~20°C

HID	H-PC-U	Date	15 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Upper Pond Creek	Q Measurement Start Time:	18:15 (HH:MM) PDT | PST	(YSI) | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	19:50 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	18:12 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	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] 0075	[D/S] 0076	[RDB] 0078	[LDB] 0077	[STAFF/WEIR] 0079

Site Comments

- very little flow, just d/s of weir input for salt input (~3m d/s (at inside bend flows)
- notch weir photo #0082
- YSI in still water; SPC_0 @ 330, but continued to drop slowly

Channel Measurements

Staff Gauge Height (m):	0.152
Weir Head (m):	
Water Temperature (°C):	10.2
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	Volumetric
Measurment ID (MID):	~~B17~~	B17
Average Q (m^3/s):	~~0.0502~~	0.0502
Q Meas. Accuracy +/- [%]:		5.0 x10 -5
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 (18:15)	289.8 | 389.1	9	0.010	20	
2 (:)	____ | ____	9	0.010	20	
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 =	____ none
Qsalt =	none

Notes:

CF.T

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

Volum.

Volume ~~(L)~~ =	1000 mL	1000 mL	1000 mL	1000 mL	1000 mL
Time (sec)	[1] 18.92	[2] 19.98	[3] 19.93	[4] 19.60	[5] 20.84
Average Q (L/s) =	0.053	0.05	0.050	0.051	0.047
Avg. Q_{vol} (L/s) =	0.0502		Avg Q_{vol} (m^3/s) =	5.0 x10 -5	

Volume for C @ ~5m d/s of weir

Hydrometric Levels - Survey

YES | NO | REASON: — Survey Time (HH:MM): (WATER) 18:50 — 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	5.323	2.323	3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B=C	1.746	3.577		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B=C	1.397	3.926		BM3			A-B=	
TOS	A+B=C	2.079	3.244		TOS			A-B=	
WATER	A+B=C	1.841	3.482		WATER			A-B=	
LOG'R ROD:	A+B=C	2.992	2.401		LOG'R ROD:			A-B=	
HWM	A+B=C		A-B=		HWM			A-B=	
BANKFULL	A+B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B=C	3.323	3.000		BS (BM1)			A-B=	

- staff guage: water appears to be still @ well
- blue sheen.

Field Staff: BSm, DS, JM
Data Entry By: ca Date: 5 Aug 2013
Reviewed By: _____ Date: _____

Project #: 13-7-069
Project Name: Mt. Iron

EDI

Weather: partly cloudy, ~16°C

HID	H-MN	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Minnesota Creek	Q Measurement Start Time:	8:49 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	9:19 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	8:48 (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] 0149	[D/S] 0150	[RDB] 0151	[LDB] 0152	[STAFF/WEIR] 0153	

Site Comments

Channel Measurements

Staff Gauge Height (m):	0.390
Weir Head (m):	
Water Temperature (°C):	5.3
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	818	
Average Q (m^3/s):	0.0182	
Q Meas. Accuracy +/- [%]:	39	
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 (8:49)	110.7 | 126.7	29	0.020	20	0.001
2 (9:02)	110.7 | 123.0	29	0.020	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	1.0 L
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	110.9 / 5.7°C
CF.T =	3.98x10-4
Qsalt =	0.0182

Notes: 500mL cr, 500mL SS
2 CFT trials since 1st reached peak after adding only 10 mL SS

Trial # 1
Trial # 2
SPC_0 Calib Tank: 110.8 / 5.8°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	10	122.2	5.8
2			
1	2	113.8	5.8
2	2	116.4	5.9
3	2	118.7	5.9
4	2	121.0	5.9
5	4	125.2	5.9
6	4	131.3	5.9
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) 8:55 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	3.579	0.579	3.000		BM1	3.611	0.611	3.000	Log'r Rod Length:	unchanged
BM2		1.270	2.309	.001	BM2		1.301	2.310	Log'r Rod to Botm:	
BM3		0.871	2.708	.00	BM3		0.903	2.708		
TOS		2.031	1.548	.00	TOS		2.063	1.548		
WATER		1.510	2.069	.001	WATER		1.541	2.070		
LOG'R ROD:		2.641	0.958	.002	LOG'R ROD:		2.671	0.940		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		0.579	3.000	.00	BS (BM1)		0.611	3.000		

Field Staff: BSm, DS, SM
Data Entry By: CR Date: 5 Aug 2013
Reviewed By: Date:

Project #: 13-7-0167
Project Name: Mt. Nansen

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: overcast, ~17°C

HID	H-VC-UMN	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Cr. U/S of Minnesota Cr.	Q Measurement Start Time:	09:11 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY (ADV) MID-SECT | POINT	
		Q Measurement End Time:	09:45 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	9:56 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	(NONE) | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 98916527	(HOBO) | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0157	[D/S] 0158	[RDB] 0161	[LDB] 0159	[STAFF/WEIR] 0160

Site Comments

re-wiring required on lower section of staff gauge

Channel Measurements

Staff Gauge Height (m):	0.594
Weir Head (m):	
Water Temperature (°C):	7.8
Water Surface Slope (%):	
Average Width (m):	4.000
Average Depth (m):	0.102

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	819	
Average Q (m^3/s):	0.1255	
Q Meas. Accuracy +/- [%]:	5.7	
Average Velocity (m/s):	0.306	
Cross-Sectional Area (m^2):	0.410	

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)	≈1.7 Css				
Csec (g/L):	1 g/L		1		
Vol. Calib. Tank (L):	1 L		2		
SPC_0 Calib. Tank			3		
CF.T =			4		
Qsalt =			5		
Notes:			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) 9:48 BM Shift: Yes \| No Logger Shift: Yes \| No Staff Gauge Shifted? Yes \| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	4.120	1.120	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1.112	3.008		BM2				Log'r Rod to Botm:	1.231 m
BM3		1.443	2.677		BM3					
TOS		2.134	1.986		TOS					
WATER		1.917	2.203		WATER					
LOG'R ROD:		2.548	1.572		LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		1.121	2.999		BS (BM1)					

Field Staff: BSm, JM, DS
Data Entry By: CL Date: 5 Aug 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt. Nansen

Weather: overcast, mod. rain ~ 4°C

HID	LH-DC-DC-D1b	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek d1b	Q Measurement Start Time:	17:54 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	18:00 (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 # N/A	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 0264	[D/S] 0265	[RDB] 0266	[LDB] 0267	[STAFF/WEIR] N/A	

Site Comments

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	6.9
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	820	
Average Q (m^3/s):	0.0006	
Q Meas. Accuracy +/- [%]:	30	
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 (17:54)	1469 | 1564	16	0.020	20	0.001
2 (17:57)	1459 | 1548	16	0.020	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	1.00 L
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1467 / 7.9°C
CF.T =	4.99×10^{-4}
Qsalt =	0.0006

Notes: 500 mL or 500 mL SS

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	1499	7.0
2.	20	1521	7.0
3.	20	1540	7.0
4.	20	1558	7.0
5.	20	1576	7.0
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) 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: BM, SM, DS
Data Entry By: CL Date: 6 AUG 2013
Reviewed By: Date:

Project #: 13-4-0167
Project Name: Mt. Nansen

Weather: overcast, light rain ~16°C

HID	H-SEEP	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	SEEP	Q Measurement Start Time:	15:45 (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:	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] 0204 / 220	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]

Site Comments

flow meter

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:	Volumetric	
Measurment ID (MID):	821	
Average Q (m^3/s):	2.8×10^{-3}	
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 (:)	____ | ____				

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.

Volume (L) =	20	20	19	19	20
Time (sec)	[1] 7.38	[2] 7.25	[3] 6.40	[4] 6.66	[5] 6.95
Average Q (L/s) =	2.584	2.758	2.96	2.85	2.88
Avg. Q_{vol} (L/s) =	2.81		Avg Q_{vol} (m^3/s) =	2.8×10^{-3}	

Hydrometric Levels - Survey

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

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1			3.000		BM1			3.000	Log'r Rod Length:	
BM2			A-B =		BM2			A-B =	Log'r Rod to Botm:	
BM3			A-B =		BM3			A-B =		
TOS			A-B =		TOS			A-B =		
WATER			A-B =		WATER			A-B =		
LOG'R ROD:			A-B =		LOG'R ROD:			A-B =		
HWM			A-B =		HWM			A-B =		
BANKFULL			A-B =		BANKFULL			A-B =		
BS (BM1)			A-B =		BS (BM1)			A-B =		

Field Staff: BSm, JM, DS
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt. Aroma

EDI

Weather: partly cloudy, ~22°C

HID	H-VCU	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Upper Victoria Creek	Q Measurement Start Time:	11:46 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	12:18 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:03 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.2486 [ ] 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] 0180	[D/S] 0181	[RDB] 0182	[LDB] 0183	[STAFF/WEIR] 0184

Site Comments

Channel Measurements

Staff Gauge Height (m):	0.125
Weir Head (m):	
Water Temperature (°C):	7.5
Water Surface Slope (%):	
Average Width (m):	4.2
Average Depth (m):	0.191

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	822	
Average Q (m^3/s):	0.1145	
Q Meas. Accuracy +/- [%]:	3.1	
Average Velocity (m/s):	0.143	
Cross-Sectional Area (m^2):	0.804	

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) 1220 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	4.164	1.164	3.000		BM1			3.000	Log'r Rod Length:	1.287
BM2	4.164	.801	3.363		BM2				Log'r Rod to Botm:	
BM3	4.164	.916	3.248		BM3					
TOS	4.164	1.267	2.897		TOS					
WATER	4.164	2.136	2.028		WATER					
LOG'R ROD:	4.164	1.018	3.146		LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	4.164	1.164	3.000		BS (BM1)					

Field Staff: BSm JM, DS
Data Entry By: CA Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-4-0163
Project Name: Mt. Klappan

Weather: mostly cloudy, light wind, 20°C

HID	H-DCR	Date	15-JULY-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek @ Road	Q Measurement Start Time:	13:27 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	13:41 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	13:14 (HH:MM) 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	ZONE	EASTING	NORTHING
Photo #	[U/S] 0038	[D/S] 0039	[RDB] 0040	[LDB] 0041	[STAFF/WEIR] 0042	

Site Comments

well bottom above cr. bed; logger covered in sediment (pic 0043) (really sticky - as if rust is sticking to it); pressure hole is coated (not full) — take note of suspicious data

Channel Measurements

Staff Gauge Height (m):	0.085
Weir Head (m):	
Water Temperature (°C):	11.8
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	823	
Average Q (m^3/s):	0.0127	
Q Meas. Accuracy +/- [%]:	35	
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 (13:27)	1211 | 1411	16	0.100	20	0.005
2 (13:36)	1211 | 1415	16	0.100	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	100
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~1~~ 500mL
SPC_0 Calib. Tank	1213 | 12.4°C
CF.T =	9.53×10^{-5}
Qsalt =	0.0129

Notes: Using 100 mL of SS into 500 mL of water Sec. Sol.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	1248	12.4
2.	20	1277	12.4
3.	40	1341	12.4
4.	40	1396	12.4
5.	40	1456	12.4
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) 15:27 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	3.703	0.703	3.000		BM1	3.632	0.632	3.000	Log'r Rod Length:	
BM2		0.755	2.948	Ø	BM2		0.684	2.948	Log'r Rod to Botm:	
BM3		1.386	2.317	Ø	BM3		1.315	2.317		
TOS		2.423	1.280	Ø	TOS		2.352	1.280		
WATER		2.028	1.675	.002	WATER		1.955	1.677		
LOG'R ROD:		3.339	0.364	.001	LOG'R ROD:		3.262	0.370		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		0.703	3.000	Ø	BS (BM1)		0.632	3.000		

Field Staff: BSm, DS, JM
Data Entry By: _____ Date: 5 AUG 2013
Reviewed By: _____ Date: _____

Project #: 13-4-0167
Project Name: Mt. Nansen

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: partly cloudy, light wind, ~22°C

HID	H-BC	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Back Creek	Q Measurement Start Time:	12:36 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	13:27 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:20 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [Y/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] 0185	[D/S] 0186	[RDB] 0189	[LDB] 0188	[STAFF/WEIR] 0190

Site Comments

- creek temp. incr. during salt trials from 14.9°C to 16.0
- station measurements unchanged

Channel Measurements

Staff Gauge Height (m):	0.172
Weir Head (m):	
Water Temperature (°C):	15.4
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	824	
Average Q (m^3/s):	0.0032	
Q Meas. Accuracy +/- [%]:	32	
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 (12:36)	343.4 | 344.8	23.5	0.0250	20	.00125
2 (13:02)	341.7 | 394.5	23.5	0.0250	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	345.7 / 16.2°C
CF.T =	3.80×10^{-4}
Qsalt =	0.0032

Notes: ~~400~~ 800 mL SS
500 mL CR

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	369.6	16.2
2.	10	380.4	16.2
3.	10	391.1	16.2
4.	10	401.7	16.2
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	
BM1	4.178	1.170	3.000		BM1			3.000	Log'r Rod Length:
BM2	4.178	1.166	3.012		BM2				Log'r Rod to Botm:
BM3	4.178	1.115	3.063		BM3				
TOS	4.178	1.515	2.663		TOS				
WATER	4.178	2.345	1.833		WATER				
LOG'R ROD:	4.178	1.280	2.898		LOG'R ROD:				
HWM	/	/	/	/	HWM				
BANKFULL	/	/	/	/	BANKFULL				
BS (BM1)	4.178	1.178	3.00		BS (BM1)				

Field Staff: BSm, DS, JM.
Data Entry By: ____ Date: 5 AUG 2013
Reviewed By: ____ Date: ____

Project #: 13-4067
Project Name: Mt. Hansen

EDI

Weather: partly cloudy, light wind, ~2300

HID	H-VC-REF	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek Reference	Q Measurement Start Time:	12:43 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY (ADV) (MID-SECT.) | POINT	
		Q Measurement End Time:	13:18 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	13:25 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [Y] 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] 0195	[D/S] 0196	[RDB] 0197	[LDB] 0198	[STAFF/WEIR] 0199

Site Comments

u/s bank collapsed causing u/s well anchor to shift (see photos); well shifted between surveys. ↑ sediment cleaned out. Large AG observed (> 10 inches)

Channel Measurements

Staff Gauge Height (m):	(new) 0.356 / .351(old)
Weir Head (m):	
Water Temperature (°C):	9.9
Water Surface Slope (%):	
Average Width (m):	3.200
Average Depth (m):	0.248

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	825	
Average Q (m^3/s):	0.1082	
Q Meas. Accuracy +/- [%]:	1.9	
Average Velocity (m/s):	0.136	
Cross-Sectional Area (m^2):	0.795	

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_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) =				
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) 13:29 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	old	new
Station	A	B	C		Station	A	B	C			
BM1	4.408	1.408	3.000		BM1	4.474	1.474	3.000	Log'r Rod Length:	1.167	
BM2		1.435	2.973		BM2		1.502	2.972	Log'r Rod to Botm:	1.180	1.225
BM3		1.363	3.045		BM3		1.430	3.044			
TOS		2.101	2.307		TOS		2.165	2.309			
WATER		1.835	2.573		WATER		1.856	2.618			
LOG'R ROD:		2.744	1.664		LOG'R ROD:		2.809	1.665			
HWM					HWM						
BANKFULL					BANKFULL						
BS (BM1)		1.407	3.001		BS (BM1)		1.474	3.000			

↳ before well shift.

Field Staff: BSm, DS, JM
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-4-017
Project Name: Mt Hansen

EDI

Weather:

HID	H-PC-DSP	Date	16 JULY 2013	Discharge Measurement Instruments + Methods
Station Name		Q Measurement Start Time:	16:51 (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:	16:54 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	N/A [ ] 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] 962	[D/S] 963	[RDB] 964	[LDB] 965 [STAFF/WEIR] 966 - 67

Site Comments

very low flow @ site

Channel Measurements

Staff Gauge Height (m):	0.130
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):	826	
Average Q (m^3/s):	~~0.126~~ 1.0×10^{-4}	
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 (:)	____ | ____				

V_1 for Sec. Mix (mL)	=1 / Csa
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] 2:34.62	[2] 2:31.11	[3] 2:34:82	[4] 2:40:08	[5] 2:38:12
Average Q (L/s) =	0.129	0.132	0.12	0.125	0.127
Avg. Q_{vol} (L/s) =	0.126		Avg Q_{vol} (m^3/s) =	1.0×10^{-4}	

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 1700 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	4.381	1.381	3.000		BM1			3.000	Log'r Rod Length:	1.167
BM2		1.165	3.216		BM2				Log'r Rod to Botm:	1.260
BM3		0.730	3.651		BM3					
TOS		1.200	3.181		TOS					
WATER		0.949	3.432		WATER					
LOG'R ROD:		2.065	2.316		LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		1.381	3.000		BS (BM1)					

Field Staff: BSm, JH, DS
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-4-0163
Project Name: Mt. Haven

Weather: Overcast, rain, ~14°C

HID	H-DX	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX	Q Measurement Start Time:	(HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	(HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	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] 0272	[D/S] 0273	[RDB] 0274	[LDB] 0275	[STAFF/WEIR]

Site Comments

Channel Measurements

Staff Gauge Height (m):	N/A
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):	827	
Average Q (m^3/s):	~~0.016~~	1.6×10^{-5}
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) =	2	1	1	1	1
Time (sec)	[1] 1,49.02	[2] 1.03.16	[3] 1.12.51	[4] 1.23.07	[5] 0.54.45
Average Q (L/s) =	0.018	0.015	0.017	0.012	0.018
Avg. Q_{vol} (L/s) =	0.016		Avg Q_{vol} (m^3/s) =	1.6×10^{-5}	

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: BSmo, JH, DS
Data Entry By: CK Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: M. Hansen

EDI

Weather: overcast, ~18°C

HID	H-VC-DBC	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Cr d/s of Back Cr.	Q Measurement Start Time:	(HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	(HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:29 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	0.0236 [↓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] 0167	[D/S] 0168	[RDB] 0169	[LDB] 0170	[STAFF/WEIR] 0171

Site Comments

- 8-9 inch RG

Channel Measurements

Staff Gauge Height (m):	0.381
Weir Head (m):	
Water Temperature (°C):	7.1
Water Surface Slope (%):	
Average Width (m):	3.800
Average Depth (m):	0.114

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	828	
Average Q (m^3/s):	0.1136	
Q Meas. Accuracy +/- [%]:	5.6	
Average Velocity (m/s):	0.263	
Cross-Sectional Area (m^2):	0.432	

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) 11:15 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		
BM1	4.264	1.264	3.000		BM1	4.237	1.237	3.000	Log'r Rod Length:	
BM2	4.264	1.238	3.026	0	BM2	4.237	1.211	3.026	Log'r Rod to Botm:	0.750
BM3	4.264	1.352	2.912	.001	BM3	4.237	1.326	2.911		
TOS	4.264	1.926	2.338	.001	TOS	4.237	1.900	2.337		
WATER	4.264	2.543	1.721	.002	WATER	4.237	2.514	1.723		
LOG'R ROD:	4.264	1.707	2.557	0	LOG'R ROD:	4.237	1.680	2.557		
HWM				0	HWM					
BANKFULL				0	BANKFULL					
BS (BM1)	4.264	1.264	3.00	0	BS (BM1)	4.237	1.237	3.000		

Field Staff: BSm, DS, JM
Data Entry By: ____ Date: 5 Aug 2013
Reviewed By: ____ Date: ____

Project #: 13-Y-0167
Project Name: Mt. Nansen

EDI ENVIRONMENTAL DYNAMICS INC

Weather: partly cloudy, light wind, ~22°C

HID	H-DC-U1	Date	15-JULY-2013	Discharge Measurement Instruments + Methods
Station Name	Dome Creek Upper 1	Q Measurement Start Time:	16:22 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	16:34 (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] 0067	[D/S] 0068	[RDB] 0069	[LDB] 0070	[STAFF/WEIR] N/A

Site Comments

low flow

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	7.6
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	829	
Average Q (m^3/s):	0.0015	
Q Meas. Accuracy +/- [%]:	22	
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 (16:22)	1327 | 1576	17	0.010	20	
2 (16:28)	1323 | 1532	17	0.010	20	
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	1350 / 8.0
CF.T =	7.39×10^{-4}
Qsalt =	0.0015

Notes: 250 mL creek and 500 mL SS

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	1373	7.8
2.	60	1419	7.8
3.	60	1465	7.8
4.	60	1511	7.8
5.	60	1536	7.8
6.	60	1570	7.8
7.	60	1599	7.8
8.	60	1631	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) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1			3.000		BM1			3.000	Log'r Rod Length:
BM2			A-B =		BM2			A-B =	Log'r Rod to Botm:
BM3			A-B=		BM3			A-B =	
TOS			A-B =		TOS			A-B =	
WATER			A-B=		WATER			A-B=	
LOG'R ROD:			A-B=		LOG'R ROD:			A-B=	
HWM			A-B=		HWM			A-B=	
BANKFULL			A-B=		BANKFULL			A-B=	
BS (BM1)			A-B=		BS (BM1)			A-B=	

Field Staff: BSm, DS, JM
Data Entry By: [illegible] Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-Y-067
Project Name: Mt. Nansen

Weather: thunder clouds, mod. wind, ~20°C

HID	H-DC-U2	Date	15 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek upper #2	Q Measurement Start Time:	17:10 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	17:24 (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] 0071	[D/S] 0072	[RDB] 0073	[LDB] 0074	[STAFF/WEIR] N/A	

Site Comments

mod. turbidity, creek flow low, single channel.
-SPC @ trial end fluctuating below SPC.

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	7.1
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	830	
Average Q (m^3/s):	0.0061	
Q Meas. Accuracy +/- [%]:	28	
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 (17:10)	1281 | 1418	15	0.0250	20	
2 (17:19)	1247 | 1436	15	0.0250	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	1261 / 7.3
CF.T =	2.94×10^{-4}
Qsalt =	0.0061

Notes: 500 mL Cr, 400mL SS

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	1292	7.4
2.	60	1355	7.4
3.	60	1410	7.4
4.	60	1461	7.4
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) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A+B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B+C		A-B=		BM2			A-B=	Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3			A-B=		
TOS	A+B+C		A-B=		TOS			A-B=		
WATER	A+B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=		
HWM	A+B+C		A-B=		HWM			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: BSm, DS, JM
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-4-0167
Project Name: Mt. Hanson

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: partly cloudy, light wind, ~ 19°C

HID	H - VCR	Date	15-JUL-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek @ Road	Q Measurement Start Time:	12:23 (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:	12:46 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	0.1606 [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] 0028	[D/S] 0027	[RDB] 0030	[LDB] 0029	[STAFF/WEIR] 0031

Site Comments

turbidity clear, water low, substrate covered in fines [visual sitting of CCG
Logger well bottom sitting ~5cm above creek bed

Channel Measurements

Staff Gauge Height (m):	0.457
Weir Head (m):	
Water Temperature (°C):	10.3
Water Surface Slope (%):	
Average Width (m):	5.550
Average Depth (m):	0.169

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	831	
Average Q (m^3/s):	0.1598	
Q Meas. Accuracy +/- [%]:	4.6	
Average Velocity (m/s):	0.171	
Cross-Sectional Area (m^2):	0.935	

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)	=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.

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) 12:32 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	3.875	.075	3.000		BM1	3.867	.867	3.000	Log'r Rod Length:
BM2	3.875	.450	3.425	.001	BM2	3.867	.443	3.424	Log'r Rod to Botm:
BM3	3.875	.705	3.170	.001	BM3	3.867	.698	3.169	
TOS	3.875	1.307	2.568	.001	TOS	3.867	1.300	2.567	
WATER	3.875	1.860	2.015	.003	WATER	3.867	1.855	2.012	
LOG'R ROD:	3.875	1.084	2.791	0	LOG'R ROD:	3.867	1.076	2.791	
HWM					HWM				
BANKFULL					BANKFULL				
BS (BM1)	3.875	.575	3.000	0	BS (BM1)	3.867	.867	3.000	

* Rod 4 AG, 6-8 inches long

Field Staff: BSm, DS, JM
Data Entry By: CL Date: 5 AUG 2013
Reviewed By: Date:

Project #: 13-4-1167
Project Name: Mt. Nansen

EDI

Weather: overcast, mod rain, ~14°C

HID	DX-DX+105	Date	16 JULY 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX+105	Q Measurement Start Time:	18:41 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	18:58 (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] 0281	[D/S] 0282	[RDB] 0283	[LDB] 0284	[STAFF/WEIR] N/A	

Site Comments

Channel Measurements

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

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	832	
Average Q (m^3/s):	0.0017	
Q Meas. Accuracy +/- [%]:	29	
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 (18:41)	1241 | 1327	12	0.010	20	.0005
2 (18:51)	1242 | 1367	12	0.010	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	20L
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1246 / 1.4°C
CF.T =	8.97×10^{-4}
Qsalt =	0.0017

Notes: 250 mL or 500 mL SS

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	40	1271	1.5
2.	40	1295	1.6
3.	40	1320	1.6
4.	40	1345	1.6
5.	40	1368	1.6
6.	40	1388	1.6
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) 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: RSam DS JM
Data Entry By: CR Date: 5 AUG 2013
Reviewed By: Date:

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

Field Dates: August 13-15, 2013

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	13.08.13	14:40	n/a	—
2	[✓]	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download	NO	Solinst Baro-logger	None	None	13.08.13	14:41	n/a	—
3	[✓]	H-PC-U	Upper Pony Creek	Instantaneous	1) Salt Tracer AND volumetric 2) Logger download.	YES	HOBO	Salt (0.01 kg) CF.T	None	13.08.13	17:10	0.201	
4	[✓]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Salt Tracer AND Volumetric 2) Logger download.	YES	HOBO	Volumetric Salt (0.01 kg) CF.T	None	13.08.13	16:25	0.149	/
5	[✓]	H-DC-DX	Dome Creek DX	Instantaneous	1) Volumetric from culvert 2) Remember photos at actual station	n/a	n/a	Volumetric	None	13.08.13	18:36	n/a	—
6	[✓]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) CF.T	None	13.08.13	17:57	n/a	—
8	[✓]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.02 kg) CF.T	None	13.08.14	14:58	n/a	/
9	[✓]	H-DC-U1	Upper Dome Creek 1	Instantaneous	1) Q measurement	YES	HOBO	Salt (0.025 kg) CF.T	None	13.08.13	15:21	—	—
10	[✓]	H-DC-U2	Upper Dome Creek 2	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.025 kg) CF.T	None	13.08.13	15:50	n/a	/
11	[✓]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement 2) Logger download.	YES	HOBO	Salt (0.05 kg) CF.T	None	13.08.13	14:24	—	—
12	[✓]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download.	YES	Solinst 1050018	Salt (0.1 kg) CF.T	None	13.08.13	13:34	0.150	—
13	[✓]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement (salt tracer and volumetric at culvert if possible) 2) Logger Download	YES	Solinst	Volumetric Salt (0.1 kg) CF.T	None	13.08.13	12:50	0.103	

* no flow! (not meas. from culvert in loc).

J:\Yukon\Projects\2013\13_Y_0167_AAM_Mount Nansen_Surface_Water\Data\Field Info\Data Sheets\August 13-15 Trip\FS_2013AUG05_Nansen Hydrology Field Sheet Aug 13-15 Trip_cl

Field Staff: CL / JM / DS

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

Field Dates: August 13-15, 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)
14	[✓]	H-VC-REF	Victoria Creek Reference	Continuous	1) Q measurement 2) Logger download	YES	HOBO	ADV	None	13.08.14	10:55	0.449	/
15	[✓]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1049522	ADV	None	13.08.14	10:20	0.198	/ -0.2543
16	[✓]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1049137	ADV	None	13.08.14	9:53	0.455	0.0304
17	[✓]	H-BC	Back Creek	Continuous	1) Q measurement if water flowing 2) Logger download	YES	HOBO	Salt (0.025 kg) CF.T	None	13.08.14	10:45	0.191	/
18	[✓]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement 2) Logger download	YES	HOBO	ADV	None	13.08.14	8:26	0.650	/
19	[✓]	H-MN	Minnesota Creek	Instantaneous	1) Q measurement 2) Logger download	YES	HOBO	Salt (0.025 kg) CF.T	None	13.08.14	8:00	0.430	
20	[✓]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1041103	ADV	None	13.08.13	11:45	0.500	0.1576
21	[✓]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	13.08.14	13:05	0.40	/
22	[✓]	H-TP	Tailings Pond	Water Level Only	1) Staff Gauge Reading	NO	n/a	None	None	13.08.14	[illegible]		

Field Staff: CV / JH / DS

Project #: 0167
Project Name: Mt. Hansen

EDI

Weather: rain heavy + 22

HID	H SEEP	Date	13 08 14	Discharge Measurement Instruments + Methods	
Station Name	Seepage Pond	Q Measurement Start Time:	13:05 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	13:20 (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] 512	[LDB] 511	[STAFF/WEIR] 510

Site Comments

Still flowing.

Channel Measurements

Staff Gauge Height (m):	0.40 (seep pond)
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):	B33	
Average Q (m^3/s):	0.003	
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 (:)	— | —				
2 (:)	— | —				
3 (:)	— | —				

V_1 for Sec. Mix (mL)	~~V_1 / Css~~
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:

Volum.

Volume (L) =	18	14	12	13	13
Time (sec)	[1] 6.48	[2] 4.61	[3] 4.77	[4] 4.38	[5] 4.57
Average Q (L/s) =	2.78	3.04	2.52	2.97	2.84
Avg. Q_{vol} (L/s) =	2.83		Avg Q_{vol} (m^3/s) =	0.003	

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

Field Staff: DS CC SM
Data Entry By: CC Date: 20 AUG 2014
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt. Rainier

EDI

Weather: Sun 25°C

HID	VC-REF	Date	14 AUG 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck. Reference	Q Measurement Start Time:	10:55 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	11:32 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:40 (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] 0502	[D/S] 0503	[RDB] 0504	[LDB] 0505	[STAFF/WEIR] ~~0506~~ 0506	

Site Comments

Site unchanged since last visit. Low to moderate flow. Large piece of RDB upstream of staff gauge well sloughed into ck. May interfere @ higher flows.

Channel Measurements

Staff Gauge Height (m):	0.449 (Gradex)
Weir Head (m):	
Water Temperature (°C):	6.9°C
Water Surface Slope (%):	
Average Width (m):	3.700
Average Depth (m):	0.303

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	834	
Average Q (m^3/s):	0.2789	
Q Meas. Accuracy +/- [%]:	1.6 %	
Average Velocity (m/s):	0.249	
Cross-Sectional Area (m^2):	1.121	

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)	~~Vol Css~~
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.

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: 11:40 Survey Time (HH:MM): (WATER) 11:40 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	4453	1453	3.000		BM1			3.000	Log'r Rod Length:
BM2		1470	2983		BM2			A-B=	Log'r Rod to Botm:
BM3		1409	3044		BM3			A-B=	
TOS		2131	2322		TOS			A-B=	
WATER		2695	1758		WATER			A-B=	
LOG'R ROD:		18.25	2698		LOG'R ROD:			A-B=	
HWM/CON			A-B=		HWM/CON			A-B=	
BANKFULL			A-B=		BANKFULL			A-B=	
BS (BM1)		1453	3.000	± 0.003	BS (BM1)			A-B=	

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

Project #: 13-4-0167
Project Name: MT Nansen

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun, 25°C

HID	H-BC	Date	14 AUG 2013	Discharge Measurement Instruments + Methods	
Station Name	Back Ck	Q Measurement Start Time:	10:45 (HH:MM) PDT | PST	(CSP) SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	11:20 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	10:55 (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] 0489 | [D/S] 0490 | [RDB] 0492 | [LDB] 0491 | [STAFF/WEIR] 0493

Site Comments

Low flow, site unchanged since previous visit.

Channel Measurements

Staff Gauge Height (m):	0.198
Weir Head (m):	—
Water Temperature (°C):	10.5°C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	B35	
Average Q (m^3/s):	0.0153	
Q Meas. Accuracy +/- [%]:	33	
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 (11:00)	336.6 | 342.6	22	0.0250	20	0.00125
2 (11:10)	337.0 | ____	22	0.0250	20	0.00125
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	800 400 ~~500~~
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~1~~ 500
SPC_0 Calib. Tank	336.0
CF.T =	3.24×10^{-4}
Qsalt =	0.0153

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	336.0	10.6
2.	16	351.4	10.6
3.	10	364.3	10.7
4.	10	378.1	10.7
5.	10	388.4	10.7
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) 10:55 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	4.329	1329	3.000		BM1			3.000	Log'r Rod Length:
BM2	A-B=C	1324	3.005		BM2			A-B=	Log'r Rod to Botm:
BM3	A-B=C	1270	3.059		BM3			A-B=	
TOS	A-B=C	1664	2.665		TOS			A-B=	
WATER	A-B=C	2469	1.68		WATER			A-B=	
LOG'R ROD:	A-B=C	1429	2.900		LOG'R ROD:			A-B=	
HWM/CON	A-B=C		A-B=		HWM/CON			A-B=	
BANKFULL	A-B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A-B=C	1.328	2.999	?0.001	BS (BM1)			A-B=	

Field Staff: CL, DS, JM
Data Entry By: CV Date: 20 AUG 2013
Reviewed By: _____ Date: _____

Project #: 13-7-017
Project Name: Mt Chapman

EDI

Weather:

HID	H-VC-U	Date	14 AUG 2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Creek Upper	Q Measurement Start Time:	10:20 (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:	10:27 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	-0.2543 [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]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]	

Site Comments

Low to moderate flow. Channel conditions unchanged since last visit.

Channel Measurements

Staff Gauge Height (m):	0.198
Weir Head (m):	—
Water Temperature (°C):	5.9
Water Surface Slope (%):	—
Average Width (m):	5.1
Average Depth (m):	0.196

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	836	
Average Q (m^3/s):	0.2783	
Q Meas. Accuracy +/- [%]:	3.5	
Average Velocity (m/s):	0.292	
Cross-Sectional Area (m^2):	0.949	

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 (:)	|				
2 (:)	|				
3 (:)	|				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1 / Css				
Csec (g/L):	1 g/L		1.		
Vol. Calib. Tank (L):	1 L		2.		
SPC_0 Calib. Tank			3.		
CF.T =			4.		
Qsalt =			5.		
Notes:			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) 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	4.365	1365	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1005	3.360		BM2				Log'r Rod to Botm:	
BM3		1122	3.243		BM3					
TOS		1466	2.899		TOS					
WATER		2279	2.086		WATER					
LOG'R ROD:		1220	3.145		LOG'R ROD:					
HWM/CON		—			HWM/CON					
BANKFULL		—			BANKFULL					
BS (BM1)		1365	3.000	± 0.001	BS (BM1)					

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

Project #: 13-Y-0169
Project Name: MT. Hansen

EDI

Weather: Sun, 25°C

DBC

HID	+/-VC-BCC	Date	14 AUG 2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Ck	Q Measurement Start Time:	9:53 (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:	12:00 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	0.0304 [ ] 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] 0473	[D/S] 0474	[RDB] 0476	[LDB] 0475	[STAFF/WEIR] 0477

Site Comments

V. low flow. Log. temp = 5.558°C
Direct read threaded caps broken (black plastic pieces)

Channel Measurements

Staff Gauge Height (m):	0.455
Weir Head (m):	—
Water Temperature (°C):	5.8°C
Water Surface Slope (%):	—
Average Width (m):	4.250
Average Depth (m):	0.160

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	837	
Average Q (m^3/s):	0.3128	
Q Meas. Accuracy +/- [%]:	2.5%	
Average Velocity (m/s):	0.459	
Cross-Sectional Area (m^2):	0.682	

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)	=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.

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) 9:55 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	4.500	1.500	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1475	3.025		BM2			A-B+C=	Log'r Rod to Botm:	
BM3		1592	2.908		BM3			A-B+C=		
TOS		2162	2.338		TOS			A-B+C=		
WATER		2708	1.792		WATER			A-B+C=		
LOG'R ROD:		1945	2.555		LOG'R ROD:			A-B+C=		
HWM/CON			A-B+C=		HWM/CON			A-B+C=		
BANKFULL			A-B+C=		BANKFULL			A-B+C=		
BS (BM1)		1501	3.001	± 0.001	BS (BM1)			A-B+C=		

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

Project #: 13-4-0167
Project Name: Mt. Manson

EDI

Weather: Sun, ~25°C

HID	H-VC-(UM)	Date	14 AUG 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek upstream of Mine Creek	Q Measurement Start Time:	8:36 (HH:MM) PDT | PST	~~ISI~~ | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	9:00 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	8:45 (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] 0462	[D/S] 0463	[RDB] 0466	[LDB] 0464	[STAFF/WEIR] 0465

Site Comments

GR @ staff gauge
- Clear to moderate turbidity
- Low flow.

Channel Measurements

Staff Gauge Height (m):	0.650
Weir Head (m):	—
Water Temperature (°C):	6.5°C
Water Surface Slope (%):	—
Average Width (m):	4.9
Average Depth (m):	0.209

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	838	
Average Q (m^3/s):	0.3212	
Q Meas. Accuracy +/- [%]:	2.5%	
Average Velocity (m/s):	0.314	
Cross-Sectional Area (m^2):	1.022	

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)	~~=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.

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) 8:30 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	4.139	1.139	3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B=C	1.134	3.005		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B=C	1463	2.676		BM3			A-B=	
TOS	A+B=C	2.1508	1.989		TOS			A-B=	
WATER	A+B=C	2508	1.631		WATER			A-B=	
LOG'R ROD:	A+B=C	1.930	2.209		LOG'R ROD:			A-B=	
HWM/CON	A+B=C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B=C	1.139	3.000	± 0.001	BS (BM1)			A-B=	

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

Project #: 13-1-0167
Project Name: ML-Manson

EDI

Weather: Sun

HID	ML-MN	Date	14 Aug 2013	Discharge Measurement Instruments + Methods	
Station Name	Minnesota Cr.	Q Measurement Start Time:	8:00 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT	
		Q Measurement End Time:	8:25 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	8:00 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	8: — [Y] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial #	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0454	[D/S] 0455	[RDB] 0456	[LDB] 0457	[STAFF/WEIR] 0458

Site Comments

How to moderate flow. V turbid w brown/orge staining on substrate. ADV possible ~30 m DS of SG.

Channel Measurements

Staff Gauge Height (m):	0.430
Weir Head (m):	—
Water Temperature (°C):	5.1°C
Water Surface Slope (%):	
Average Width (m):	1.52
Average Depth (m):	0.152

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	839	
Average Q (m^3/s):	0.0383	
Q Meas. Accuracy +/- [%]:	2.3	
Average Velocity (m/s):	0.186	
Cross-Sectional Area (m^2):	0.231	

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) 8:10 — 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	
BM1	3.570	0570	3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B=C	1262	2.308		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B=C	0865	2.705		BM3			A-B=	
TOS	A+B=C	2015	1.555		TOS			A-B=	
WATER	A+B=C	2585	0.985		WATER			A-B=	
LOG'R ROD:	A+B=C	1695	1.875		LOG'R ROD:			A-B=	
HWM/CON	A+B=C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B=C	0570	3.000	√ 0.000	BS (BM1)			A-B=	

Field Staff: CL, JH, DS
Data Entry By: CL — Date: 20 Aug 2013
Reviewed By: _____ Date: _____

Project #: 13-70167
Project Name: _____

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun, 25°C

HID	1- DC-D1b	Date	14 AUG 2013	Discharge Measurement Instruments + Methods	
Station Name	DC-D1b Donna Creek @ D1b	Q Measurement Start Time:	14:58 (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] 0529	[D/S] 0530	[RDB] —	[LDB] —	[STAFF/WEIR] —

Site Comments

DC-D1b good to ground.

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	10.5°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	840	
Average Q (m^3/s):	0.0032	
Q Meas. Accuracy +/- [%]:	28	
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 (15:02)	1474 | 1585	26	0.020	20	0.001
2 (15:10)	1482 | 1587	20	0.020	20	0.001
3 (:)	— | —				

V_1 for Sec. Mix (mL)	506
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~X~~ 506
SPC_0 Calib. Tank	
CF.T =	3.77×10^{-4}
Qsalt =	0.0032

Notes: D.tm, bkk. YSI - rotor kicks up sediment & jumps SPC readings

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1479	10.6°C
2.	10	1494	10.6°C
3.	10	1506	10.8°C
4.	20	1535	10.8°C
5.	20	1555	10.9°C
6.	20	1576	11.0
7.	20	1600	11.0
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) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	A+B=C		3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B=C		A-B=		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B=C		A-B=		BM3			A-B=	
TOS	A+B=C		A-B=		TOS			A-B=	
WATER	A+B=C		A-B=		WATER			A-B=	
LOG'R ROD:	A+B=C		A-B=		LOG'R ROD:			A-B=	
HWM/CON	A+B=C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B=C		A-B=		BS (BM1)			A-B=	

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

Project #: 13-41-0164
Project Name: Mt. Hansen

EDI

Weather: Sun, chance of thunder

HID	LT-PC-U	Date	13-Aug-2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Creek upstream	Q Measurement Start Time:	17:10 (HH:MM) PDT | PST	(SI) | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	17:42 (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] 0435	[D/S] 0436	[RDB] 0439	[LDB] 0437	[STAFF/WEIR] 0438

Site Comments

U. low flow, large expansion trench present on S. side of creek
- compare to Soc. DSP for solubility & conc.
- mass
Logger ~ 6" under water

Channel Measurements

Staff Gauge Height (m):	0.201
Weir Head (m):	
Water Temperature (°C):	9.0 °C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	BM1	
Average Q (m³/s):	0.0019	
Q Meas. Accuracy +/- [%]:	13	
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 EC$_o$(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 (17:17)	175.7 | 218.2	30	0.010	20L	0.0005
2 (17:27)	183.2 | 215.7	30	0.010	20L	0.0005
3 (:)	|				

V_1 for Sec. Mix (mL)	~~1 / Csec~~ 500
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~1~~ 250
SPC_o Calib. Tank	
CF.T =	6.78×10^{-4}
Qsalt =	0.0019

Notes: U. slow salt wave, Attenuated by porous media & poor mixing

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	179.8	9.7°C
2.	10	190.4	9.6°C
3.	10	200.2	9.5°C
4.	10	209.4	9.4°C
5.	10	217.7	9.4
6.	10	227.1	9.4
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) 17:30 BM Shift: Yes| (No) Logger Shift: Yes| (No) Staff Gauge Shifted?: Yes| (No)

Circuit #1 Station	H I A	Rod Read B	Elevation (m) C	± 0.003	Circuit #2 Station	H I A	Rod Read B	Elevation (m) C	Station Measurements
BM1	5.485	2485	3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B+C	1909	~~1.908~~ 3.577		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B+C	1555	~~1.555~~ 3.93		BM3			A-B=	
TOS	A+B+C	2242	3.243		TOS			A-B=	
WATER	A+B+C	3035	2.450		WATER			A-B=	
LOG'R ROD:	A+B+C	2001	3.484		LOG'R ROD:			A-B=	
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B+C	2485	3.000	± 0.001	BS (BM1)			A-B=	

Field Staff: CL, SM
Data Entry By: CL Date: 20 AUG 2013
Reviewed By: Date:

Project #: _____
Project Name: _____

EDI

Weather: Sun, 25°C

HID	H-PC-05T	Date	13-AUG-2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Ck. Downstream of Pit	Q Measurement Start Time:	1625 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	1645 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	16:30 (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] 0430	[D/S] 0431	[RDB] 0432	[LDB] 0433	[STAFF/WEIR] 0434

Site Comments

V. low flow. SS not possible. Volumetric taken @ Weir upstream. Logger in 7 15 cm

Channel Measurements

Staff Gauge Height (m):	0.149
Weir Head (m):	—
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	√	
Measurment ID (MID):	842	
Average Q (m^3/s):	0.0004	
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_o(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 (:)	——— | ———				
2 (:)	——— | ———				
3 (:)	——— | ———				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1 / Csec		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	20	20	20	20
Time (sec)	[1] 54.11	[2] 54.57	[3] 55.10	[4] 55.10	[5] 55.01
Average Q (L/s) =	54.778				
Avg. Q_{vol} (L/s) =	0.365		Avg Q_{vol} (m^3/s) =	0.0004	

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 16:45 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1 Station	H I A	Rod Read B	Elevation (m) C	± 0.003	Circuit #2 Station	H I A	Rod Read B	Elevation (m) C	Station Measurements
BM1	4.414	1.414	3.000		BM1			3.000	Log'r Rod Length:
BM2		1.200	3.214		BM2			A-B=	Log'r Rod to Botm:
BM3		0.765	3.649		BM3			A-B=	
TOS		1233	3.181		TOS			A-B=	
WATER		2.085	2.329		WATER			A-B=	
LOG'R ROD:		0985	3.429		LOG'R ROD:			A-B=	
HWM/CON			A-B=		HWM/CON			A-B=	
BANKFULL			A-B=		BANKFULL			A-B=	
BS (BM1)		1.415	3.001	±0.003	BS (BM1)			A-B=	

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

Project #: _____
Project Name: _____

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: _____

HID	DC-U2	Date	13-AUG-2013	Discharge Measurement Instruments + Methods			
Station Name	Dome Creek Upper #2	Q Measurement Start Time:	1550 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT		
		Q Measurement End Time:	1603 (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] 0426	[D/S] 0427	[RDB] 0428	[LDB] 0429	[STAFF/WEIR]		

Site Comments

U. low flow. Obvious apparent "pulse" channel along valley. U. soft & porous medium. Turbid & high DOC?

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:	SS	
Measurment ID (MID):	843	
Average Q (m^3/s):	0.0065	
Q Meas. Accuracy +/- [%]:	22	
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 (15:51)	1150 | 1285		0.0250	20	0.00125
2 (15:57)	1135 | 1242		0.0250	20	0.00125
3 (:)	|				

V_1 for Sec. Mix (mL)	=1 / Css*400
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~14~~ 500
SPC_0 Calib. Tank	1188
CF.T =	3.90×10^{-4}
Qsalt =	0.0065

Notes:
Stream temp = 9.3°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1188	9.9°C
2.	60	1253	9.9°C
3.	30	1281	9.9°
4.	20	1310	9.9
5.	30	1337	9.9
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 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		
BM1	A+B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B+C		A-B =		BM2			A-B =	Log'r Rod to Botm:	
BM3	A+B+C		A-B =		BM3			A-B =		
TOS	A+B+C		A-B =		TOS			A-B =		
WATER	A+B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: _____
Data Entry By: _____ Date: 20 AUG 2013
Reviewed By: _____ Date: _____

Project #: 13-1-0167
Project Name: Mt. Klappan

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun, 25°C

HID	H-DC-U1	Date	13-Aug-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek upper 1	Q Measurement Start Time:	15:21 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	15:43 (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] 0422	[D/S] 0423	[RDB] 0425	[LDB] 0424	[STAFF/WEIR] —

Site Comments

V. low flow. Small eddy @ site. Orange stained sediments + foam present. Site is spongy moss + sphagnum.

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:	SS	
Measurement ID (MID):	844	
Average Q (m^3/s):	0.0018	
Q Meas. Accuracy +/- [%]:	~~3.90x10⁻⁴~~	21%
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)	1256 | 1574	20	0.0250	20	0.00125
2 (15:30)	1259 | 1586	20	0.0250	20	0.00125
3 (:)	— | —				

V_1 for Sec. Mix (mL)	~~EC / Css~~ 400
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~20~~ 500
SPC_0 Calib. Tank	
CF.T =	3.90×10^{-4}
Qsalt =	0.0018

Notes: Fairly unique peak, used Ss. Reduced volume of calib. Salt to fit 1 L. Ck temp = 10.3°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1269	10.7
2.	20	1285	10.9
3.	40	1334	10.9
4.	40	1378	10.9
5.	40	1417	11.0
6.	40	1456	11.0
7.	40	1488	11.0
8.	40	1522	11.0
9.	60	1563	11.0

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

Field Staff: CK, JM
Data Entry By: CK Date: 20 Aug 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt. Klappan

EDI

Weather: P. Cloudy, 25°C

HID	14-DC-13	Date	13-Aug-2013	Discharge Measurement Instruments + Methods
Station Name	Dome Ck - Diversion Chan @ Bridge	Q Measurement Start Time:	1424 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	1500 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	14:40 (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] 0417	[D/S] 0418	[RDB] 0420	[LDB] 0419	[STAFF/WEIR] 0421	

Site Comments

U low flow. Downloaded Logger in ~5cm of water need to deepen discontinue Station - instantaneous only

ATM-DC2 SG6 DLC @ 14:45

Channel Measurements

Staff Gauge Height (m):	0.093
Weir Head (m):	—
Water Temperature (°C):	20.2°C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	845	
Average Q (m^3/s):	0.0051	
Q Meas. Accuracy +/- [%]:	30	
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 (14:30)	1321 | 1491	18	0.050	20	0.0025
2 (14:38)	1322 | 1509	18	0.050	20	0.0025
3 (:)	|				

V_1 for Sec. Mix (mL)	~~200~~
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~10~~ 500mL
SPC_0 Calib. Tank	
CF.T =	2.40×10^{-4}
Qsalt =	0.0051

Notes: 1. gauge wave, turbid H2O 1.5 m silt.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1321	20.5
2.	20	1348	20.4
3.	20	1370	20.4
4.	20	1392	20.4
5.	30	1422	20.4
6.	30	1445	20.4
7.	40	1488	20.4
8.	40	1522	20.5
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) 1510 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.~~090~~911	0911	3.000		BM1			3.000	Log'r Rod Length:
BM2		0556	3.355		BM2			A-B =	Log'r Rod to Botm:
BM3		0917	2.996		BM3			A-B =	
TOS		1565	2.346		TOS			A-B =	
WATER		2470	1.441		WATER			A-B =	
LOG'R ROD:		1058	2.853		LOG'R ROD:			A-B =	
HWM/CON			A-B=		HWM/CON			A-B=	
BANKFULL			A-B=		BANKFULL			A-B=	
BS (BM1)		6911	3.000		BS (BM1)			A-B=	

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

Project #: 13-4-0167
Project Name: Mt. Nansen

EDI

Weather: Sun, 25°C

HID	14-DC-M	Date	13-Aug 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek middle	Q Measurement Start Time:	13:54 (HH:MM) PDT | PST	SBI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	(HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	14:00 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.3186 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] 0413	[D/S] 0414	[RDB] 0415	[LDB] 0416	[STAFF/WEIR] 0415	

Site Comments

V. low flow turbidity clear. Orange dust / silt on bed & floodplain.
- long/attenuated SS, likely due to eddy @ SG.

Channel Measurements

Staff Gauge Height (m):	0.1500
Weir Head (m):	—
Water Temperature (°C):	16.2°C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurement ID (MID):	846	
Average Q (m^3/s):	0.0073	
Q Meas. Accuracy +/- [%]:	30	
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 (13:44)	1365 | 1483	44	0.100	20	0.005
2 (13:58)	1368 | 1436?	44	0.100	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200 / Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1376
CF.T =	1.30×10^{-4}
Qsalt =	0.0073

Notes:
V. slow peak & spill wave

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1376	16.6
2.	30	1413	16.6
3.	10	1424	16.6
4.	10	1437	16.6
5.	10	1449	16.6
6.	90	1471	16.6
7.	20	1492	16.6
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) 1406 — 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	4.439	1439	3.000		BM1			3.000	Log'r Rod Length:
BM2		2099	2.734		BM2			A-B =	Log'r Rod to Botm:
BM3		1708	2.731		BM3			A-B =	
TOS		1949	2.490		TOS			A-B =	
WATER		2001	1.638		WATER			A-B =	
LOG'R ROD:		1718	2.721		LOG'R ROD:			A-B =	
HWM/CON			A-B =		HWM/CON			A-B =	
BANKFULL			A-B =		BANKFULL			A-B =	
BS (BM1)		1439	3.158		BS (BM1)			A-B =	

Field Staff: CL JM
Data Entry By: CL Date: 20 AUG 2013
Reviewed By: Date:

Project #: 13-4-0167
Project Name: Mt. Hansen

EDI

Weather: Sun, 25°C

HID	14-DC-R	Date	13-Aug-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Ck Rd	Q Measurement Start Time:	12:50 (HH:MM) PDT | PST	SALT | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	13:12 (HH:MM) PDT | PST	SALT/TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:51 (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] 0409	[D/S] 0410	[RDB] 0412	[LDB] 0411	[STAFF/WEIR] 0411	

Site Comments

V. low flow. Silt accumulation on logger + logger rod. Site o.k. for hyd.

Channel Measurements

Staff Gauge Height (m):	0.103
Weir Head (m):	—
Water Temperature (°C):	10.6°
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	849	
Average Q (m^3/s):	0.0122	
Q Meas. Accuracy +/- [%]:	29	
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

SCDG \| 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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	1129 | 1343	25	0.100	20	0.005
2 (13 : 01)	1128 | 1340	25	0.100	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200 = 1 / Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	1.14×10^{-4}
Qsalt =	0.0122

Notes:
CF.T didn't go high enough, but enough data to extrapolate.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1134	11.1
2.	10	1149	11.2
3.	10	1162	11.2
4.	10	1177	11.2
5.	20	1204	11.2
6.	30	1242	11.2
7.	30	1279	11.2
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:

Survey Time (HH:MM): (WATER) 1321 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	3.750	0.750	3.000		BM1			3.000	Log'r Rod Length:
BM2	A+B=C	0.785	2.965		BM2			A-B=	Log'r Rod to Botm:
BM3	A+B=C	1.427	2.323		BM3			A-B=	
TOS	A+B=C	2.451	1.299		TOS			A-B=	
WATER	A+B=C	3.349	0.401		WATER			A-B=	
LOG'R ROD:	A+B=C	2.053	1.697		LOG'R ROD:			A-B=	
HWM/CON	A+B=C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B=C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B=C	0.750	3.000	± 0.003	BS (BM1)			A-B=	

Field Staff: CL, JM, DS
Data Entry By: CL Date: 20 Aug 2013
Reviewed By: Date:

Project #: 13-4-0167
Project Name: Mt. Hansen

EDI

Weather: Sun 23°C

HID	H-VC-R	Date	13-Aug-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck at Road	Q Measurement Start Time:	11:45 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV | MIDSECT. | POINT	
		Q Measurement End Time:	12:19:40 (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)	0.1576 [downloaded]	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 104103	HOBO | Solinst | N/A	8.289°C	GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0403	[D/S] 0405	[RDB] 0406	[LDB] 0408	[STAFF/WEIR] 104-0404

Site Comments

V. low flow. clear, low turbidity. Good time to survey control & Bankful.
GR obscured (x2)

Channel Measurements

Staff Gauge Height (m):	0.500
Weir Head (m):	—
Water Temperature (°C):	— 8.4 °C
Water Surface Slope (%):	—
Average Width (m):	6.250
Average Depth (m):	0.190

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	848	
Average Q (m^3/s):	0.3696	
Q Meas. Accuracy +/- [%]:	3.2	
Average Velocity (m/s):	0.311	
Cross-Sectional Area (m^2):	1.190	

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)	=1 / Css
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.

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) 12:30 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	4.075	1.075	3.000		BM1			3.000	Log'r Rod Length:
BM2	0.650	0.905	3.170		BM2			A-B=	Log'r Rod to Botm:
BM3		0.905	3.170		BM3			A-B=	
TOS		1.505	2.795		TOS			A-B=	
WATER		2.005	2.295		WATER			A-B=	
LOG'R ROD:		1.284	2.971		LOG'R ROD:			A-B=	
HWM/CON		—	A-B=		HWM/CON			A-B=	
BANKFULL		—	A-B=		BANKFULL			A-B=	
BS (BM1)		1.075	3.425		BS (BM1)			A-B=	

Field Staff: CL / JH
Data Entry By: _____ Date: 20 Aug 2013
Reviewed By: _____ Date: _____

Project #: _____
Project Name: _____

EDI

Weather: _____

HID	H-DC-DX	Date	13-Aug-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek @ DX	Q Measurement Start Time:	18:36 (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] 0447	[D/S] 0448	[RDB] 0449	[LDB] 0450	[STAFF/WEIR] —	

Site Comments

Culvert only had drips in culvert. DX station has too low flow to sample. ~ 1.5 mL/s

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:		
Measurment ID (MID):	849	
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 (:)	____ | ____				

			Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1 / Css	CF.T	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	
BM1	A+B+C		3.000	BM1			3.000	Log'r Rod Length:
BM2	A+B+C		A-B =	BM2			A-B =	Log'r Rod to Botm:
BM3	A+B+C		A-B =	BM3			A-B =	
TOS	A+B+C		A-B =	TOS			A-B =	
WATER	A+B+C		A-B=	WATER			A-B=	
LOG'R ROD:	A+B+C		A-B=	LOG'R ROD:			A-B=	
HWM/CON	A+B+C		A-B=	HWM/CON			A-B=	
BANKFULL	A+B+C		A-B=	BANKFULL			A-B=	
BS (BM1)	A+B+C		A-B=	BS (BM1)			A-B=	

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

Project #: B-Y-0167
Project Name: Mt Clausen

EDI

Weather: Sun, cloud & thund

HID	H-DC-DX+105	Date	13-AUG-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX+105m	Q Measurement Start Time:	1757 (HH:MM) PDT | PST	(YSI) SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	1833 (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] 0440	[D/S] 0441	[RDB] 0442	[LDB] 0443	[STAFF/WEIR] —

Site Comments

V. low flow, typically lowest of year

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	2.1°C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	850	
Average Q (m^3/s):	0.0030	
Q Meas. Accuracy +/- [%]:	30	
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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

Trial Time	SPC_B | SPC_P EC_o(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 (18:00)	1225 | 1300	30	0.010	20	0.0005
2 (18:14)	1230 | 1282	30	0.010	20	0.0005
3 (:)	|				

V_1 for Sec. Mix (mL): =1 / Css 500
Csec (g/L): 1 g/L
Vol. Calib. Tank (L): ~~1~~ 250
SPC_0 Calib. Tank
CF.T = 4.81×10^{-4}
Qsalt = 0.0030

Notes: St temp = 2.1°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1220	3.1°C
2.	10	1231	3.2°C
3.	20	1243	3.3°C
4.	20	1255	3.4°C
5.	20	1266	3.4°C
6.	20	1278	3.4°C
7.	20	1290	3.6
8.	20	1300	3.6
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			3.000	Log'r Rod Length:
BM2	A+B+C		A-B =		BM2			A-B =	Log'r Rod to Botm:
BM3	A+B+C		A-B =		BM3			A-B =	
TOS	A+B+C		A-B =		TOS			A-B =	
WATER	A+B+C		A-B=		WATER			A-B=	
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=	
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=	

Field Staff: CL, JM
Data Entry By: CL Date: 20 AUG 2013
Reviewed By: Date:

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

Field Dates: Sept 23-24

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	13.09.		n/a	
2	[ ]	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download	NO	Solinst Baro-logger	None	None	13.09.		n/a	
3	[✓]	H-PC-U	Upper Pony Creek	Instantaneous	1) Salt Tracer AND volumetric 2) Logger download.	YES	HOBO	Salt (0.01 kg) CF.T	None	13.09.23	1715	0.270	
4	[✓]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Salt Tracer AND Volumetric 2) Logger download.	YES	HOBO	Volumetric Salt (0.01 kg) CF.T	None	13.09.23	1651	0.268	
5	[✓]	H-DC-DX	Dome Creek DX	Instantaneous	1) Volumetric from culvert 2) Remember photos at actual station	n/a	n/a	Volumetric	None	13.09.		n/a	
6	[✓]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) CF.T	None	13.09.23	1846	n/a	
8	[✓]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.02 kg) CF.T	None	13.09.23	1817	n/a	
9	[✓]	H-DC-U1	Upper Dome Creek 1	Instantaneous	1) Q measurement	YES	HOBO	Salt (0.025 kg) CF.T	None	13.09.23	16:06	n/A	
10	[✓]	H-DC-U2	Upper Dome Creek 2	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.025 kg) CF.T	None	13.09.23	1620	n/a	
11	[✓]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement 2) Logger download.	YES	HOBO	Salt (0.05 kg) CF.T	None	13.09.23	1518	0.146	
12	[✓]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download.	YES	Solinst 1050018	Salt (0.1 kg) CF.T	None	13.09.23	1441	0.180	
13	[✓]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement (salt tracer and volumetric at culvert if possible) 2) Logger Download	YES	Solinst	Volumetric Salt (0.1 kg) CF.T	None	13.09.23	1515	0.285	

Field Staff: CL DH DS

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

Field Dates: Sept 23-24

#	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 2) Logger download.	YES	HOBO	ADV	None	13.09.24	1250	0.604	
15	[✓]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement 2) Logger download.	YES	Solinst 1049522	ADV	None	13.09.24	1130	0.272	
16	[✓]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement 2) Logger download.	YES	Solinst 1049137	ADV	None	13.09.24	1050	0.568	
17	[✓]	H-BC	Back Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.025 kg) CF.T	None	13.09.24	1220	0.270	
18	[✓]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement 2) Logger download.	YES	HOBO	ADV	None	13.09.24	920	0.745	
19	[✓]	H-MN	Minnesota Creek	Instantaneous	1) Q measurement 2) Logger download.	YES	HOBO	Salt (0.025 kg) CF.T	None	13.09.24	~~0.538~~	0.538	
20	[✓]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement 2) Logger download.	YES	Solinst 1041103	ADV	None	13.09.23	1230	0.575	
21	[✓]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	13.09.24	1555	—	
22	[✓]	H-TP	Tailings Pond	Water Level Only	1) Staff Gauge Reading	NO	n/a	None	None	13.09.			

J:\Yukon\Projects\2013\13_Y_0167_AAM_Mount Nansen_Surface_Water\Data\Field Info\Data Sheets\September 23-25 Trip\FS_2013SEP19_Nansen Hydrology Field Sheet Sept 23-25 Trip_cf

Field Staff: CL DH DS

Project #: 13-4-0167
Project Name: Mount Nansen Water Quality

EDI

Weather: -2°C, cloudy, light wind.

HID	VH-UC-RoF	Date	24-Sept-2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Ck Reference	Q Measurement Start Time:	12:50 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | (ADV) MID-SECT | POINT
		Q Measurement End Time:	13:17 (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 #	(HOBO) | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]	

Site Comments

Moderate flow, 5 Arctic Grayling (~6" length)

Channel Measurements

Staff Gauge Height (m):	0.604
Weir Head (m):	
Water Temperature (°C):	1.7°C
Water Surface Slope (%):	
Average Width (m):	5.2 m
Average Depth (m):	0.194

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	870	
Average Q (m^3/s):	0.7499	
Q Meas. Accuracy +/- [%]:	4.7%	
Average Velocity (m/s):	0.744	
Cross-Sectional Area (m^2):	1.008	

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) 1319 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	4283	1283	3.000		BM1	4313	1313	3.000	Log'r Rod Length:	
BM2	A+B+C	1295	2.988		BM2		1325	2.988	Log'r Rod to Botm:	
BM3	A+B+C	1244	3.039		BM3		1274	3039		
TOS	A+B+C	1953	2330		TOS		1982	2331		
WATER	A+B+C	2356	1927		WATER		2392 / 2387	1921 / 1926		
LOG'R ROD:	A+B+C	1647	2636		LOG'R ROD:		1677	2636		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DH RS
Data Entry By: ec Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-4-0167
Project Name: Mount Nansen Water Quality

EDI

Weather: -2, cloudy w light wind. Snow on ground.

HID	H-BC	Date	24 Sep 2013
Station Name	Back Creek	Q Measurement Start Time:	12:20 (HH:MM) PDT | PST
		Q Measurement End Time:	12:40 (HH:MM) PDT | PST
		Logger Download/Inst Time:	12:30 (HH:MM) PDT | PST
		Logger Reading (m)	[ ] downloaded

Discharge Measurement Instruments + Methods
SBI | 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]	[D/S]	[RDB] [LDB] [STAFF/WEIR]

Site Comments
Shifting wall layer sitting just above sediments

Channel Measurements

Staff Gauge Height (m):	0.230 m
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):	871	
Average Q (m^3/s):	0.0530	
Q Meas. Accuracy +/- [%]:	36%	
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 (12:20)	277.2 |	26	0.025	20	0.00125
2 (12:30)	277.2 | 295.9	26			
3 (:)	|				

V_1 for Sec. Mix (mL)	400
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	500
SPC_0 Calib. Tank	
CF.T =	4.67×10^{-4}
Qsalt =	0.0530

Notes:
Mod. ends flow.
T = 1.8°C
(low) (mod) turbidity

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	5	281.6	1.5
2.	10	289.1	
3.	10	295.0	
4.	10	305.6	
5.	10	314.1	
6.	20	334.8	
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
Station	A	B	C	
BM1	4252	1252	3.000	
BM2	A+B-C	1247	3005	
BM3	A+B-C	1197	3055	
TOS	A+B-C	1586	2666	
WATER	A+B-C	2322	1930	
LOG'R ROD:	A+B-C	1352	2900	
HWM/CON	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	A	B	C
BM1	4226	1226	3.000
BM2		1222	3004
BM3		1169	3057
TOS		1563	2663
WATER		2294	1932
LOG'R ROD:		1326	2900
HWM/CON			A-B=
BANKFULL			A-B=
BS (BM1)			A-B=

Station Measurements

Log'r Rod Length:	
Log'r Rod to Botm:	

Field Staff: CL DH DJ
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mt. Nansen

EDI

Weather: -2°C, snow on ground, cloudy

HID	MT-VC-DB C	Date	24 Sept 2013	Discharge Measurement Instruments + Methods
Station Name		Q Measurement Start Time:	10:50 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY (ADV) MID-SECT. | POINT
		Q Measurement End Time:	11:30 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	11:15 (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

Site remains unchanged from previous visit. Moderate flow.

Channel Measurements

Staff Gauge Height (m):	0.568
Weir Head (m):	—
Water Temperature (°C):	1.1 °C
Water Surface Slope (%):	—
Average Width (m):	5.0 m
Average Depth (m):	0.278

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	873	
Average Q (m^3/s):	0.7848	
Q Meas. Accuracy +/- [%]:	1.8%	
Average Velocity (m/s):	0.565	
Cross-Sectional Area (m^2):	1.390	

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 (:)	____ | ____				

		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.		

CF.T

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) 11:15 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		
BM1	4336	1336	3.000		BM1	4364	1364	3.000	Log'r Rod Length:	
BM2	A+B-C	1309	3027		BM2		1339	3025	Log'r Rod to Botm:	
BM3	A+B-C	1433	2903		BM3		* 1452	2912		
TOS	A+B-C	1995	2341		TOS		2023	2341		
WATER	A+B-C	2442	1894		WATER		2463	1901		
LOG'R ROD:	A+B-C	1777	2559		LOG'R ROD:		1804	2560		
HWM/CON	A+B-C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B-C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B-C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DH DS
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: MI Narrows

EDI

Weather: -4, snow on ground.

HID	H-VC-U MN	Date	24 Sep 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck. Upstream of Minnesota	Q Measurement Start Time:	9:20 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	10:07 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	10:07 (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

Moderate flows.
Survey done by DH - off a little - check numbers

Channel Measurements

Staff Gauge Height (m):	0.745
Weir Head (m):	
Water Temperature (°C):	1.0°C
Water Surface Slope (%):	
Average Width (m):	4.9
Average Depth (m):	0.309

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	874	
Average Q (m^3/s):	0.7825	
Q Meas. Accuracy +/- [%]:	2.9%	
Average Velocity (m/s):	0.517	
Cross-Sectional Area (m^2):	1.515	

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)	=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.

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) 10:07 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	4009	1009	3.000		BM1	3951	0951	3.000	Log'r Rod Length:
BM2	A+B-C	1010	2999		BM2		0952	2999	Log'r Rod to Botm:
BM3	A+B-C	1367	2642		BM3		1278 | 1247	2673 | 2704	
TOS	A+B-C	1974	2035		TOS		1966	1985	
WATER	A+B-C	2289	1720		WATER		2177	1774	
LOG'R ROD:	A+B-C	1806	2203		LOG'R ROD:		1749	2202	
HWM/CON	A+B-C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B-C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B-C		A-B=		BS (BM1)			A-B=	

Field Staff: CL DH DS
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mount Nansen Water Quality

EDI

Weather: -4°C, snow

HID	MN	Date	24-Sept-2013	Discharge Measurement Instruments + Methods
Station Name	Minnesota Ck	Q Measurement Start Time:	8:00 (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:	8:32 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	[U]/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

Good to moderate flow.

Channel Measurements

Staff Gauge Height (m):	0.538
Weir Head (m):	
Water Temperature (°C):	0.5 °C
Water Surface Slope (%):	
Average Width (m):	1.140
Average Depth (m):	0.302

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	875	
Average Q (m^3/s):	0.1229	
Q Meas. Accuracy +/- [%]:	3.9%	
Average Velocity (m/s):	0.357	
Cross-Sectional Area (m^2):	0.345	

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)	≈1.1 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) 832 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	3547	0547	3.000		BM1	3486	0486	3.000	Log'r Rod Length:	
BM2		1247	2300		BM2		1183	2303	Log'r Rod to Botm:	
BM3		0785	2362		BM3		0782	2704		
TOS		1947	1600		TOS		1936	1550		
WATER		2449	1098		WATER		2388	1098		
LOG'R ROD:		1468	2079		LOG'R ROD:		1404	2082		
HWM/CON					HWM/CON					
BANKFULL		where 6			BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: CL DS DH
Data Entry By: CL Date: 30 Sept. 17
Reviewed By: Date:

Project #: 13-4-3163
Project Name: Mt Carrier

EDI

Weather: Overc. -2°C

HID	H-SEEP	Date	24 Sept 2013	Discharge Measurement Instruments + Methods
Station Name	SEEP below tailings Pond	Q Measurement Start Time:	1555 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	1600 (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] 0798	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]	

Site Comments

Same flow as previous. Site unchanged. Volumetric flow unreliable b/c tiny volume filled are too small. Must rely on totalizer readout for flow.

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):	876	
Average Q (m^3/s):	0.00387	
Q Meas. Accuracy +/- [%]:	10%	
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) =	10	11	10	11	9
Time (sec)	[1] 2.58	[2] 2.84	[3] 2.52	[4] 2.75	[5] 2.45
Average Q (L/s) =	3.87	3.87	3.96	4.0	3.67
Avg. Q_{vol} (L/s) =	3.83		Avg Q_{vol} (m^3/s) =	0.00387	

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

Field Staff: CL DS DH
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-7-0167
Project Name: Mt. Nansen

EDI

Weather: Snow, 3°C

HID	H-DC-R	Date	03-Sept-2013	Discharge Measurement Instruments + Methods
Station Name	Donnel Creek Road	Q Measurement Start Time:	1345 (HH:MM) PDT | PST	VS | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	1405 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	1345 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	— ft / 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

Unchanged from previous visit

Channel Measurements

Staff Gauge Height (m):	0.285
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):	877	
Average Q (m^3/s):	0.0849	
Q Meas. Accuracy +/- [%]:	3.0%	
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 (13:51)	646.2 | 760	20	0.100	20	0.005
2 (13:57)	645.2 | 750.5	20	0.100	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	640.1
CF.T =	5.91×10^{-5}
Qsalt =	0.0849

Notes: Good Flow, 2 °C Ambient

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	640.1	2.5
2.	20	674.4	2.3
3.	20	749.0	2.3
4.	20	788.4	2.3
5.	20	841.2	2.3
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) 1345 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	3795	0795	3.000		BM1	3724	0724	3.000	Log'r Rod Length:	
BM2		0845	2950		BM2		0757	2967	Log'r Rod to Botm:	
BM3		1487	2308		BM3		1427	2297		
TOS		2501	1294		TOS		2430	1294		
WATER		3224	0571		WATER		3145	579		
LOG'R ROD:		2104	1691		LOG'R ROD:		2032	1692		
HWM/CON					HWM/CON					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: C. DS DW
Data Entry By: C Date: 26 Sept. 2013
Reviewed By: Date:

Project #: 13-1-0163
Project Name: Mt Klaser

EDI

Weather: Snow, 5°C

HID	H-VC-R	Date	23-Sep-2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Ck at Road	Q Measurement Start Time:	12:30 (HH:MM) PDT | PST	VSH | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	13:16 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	12:30 (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

Site unchanged from previous visit

Channel Measurements

Staff Gauge Height (m):	0.575
Weir Head (m):	–
Water Temperature (°C):	2.2
Water Surface Slope (%):	
Average Width (m):	4.80
Average Depth (m):	0.365

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	878	
Average Q (m^3/s):	0.9490	
Q Meas. Accuracy +/- [%]:	2.6	
Average Velocity (m/s):	0.530	
Cross-Sectional Area (m^2):	1.790	

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.		

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) 12:30 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	4113	1113	3.000		BM1	4069	1069	3.000	Log'r Rod Length:
BM2	A+B+C	0698	3415		BM2		0654	3415	Log'r Rod to Botm:
BM3	A+B+C	0945	3168		BM3		0900	3169	
TOS	A+B+C	1595	2518		TOS		1501	2568	
WATER	A+B+C	1977	2136		WATER		1931	2138	
LOG'R ROD:	A+B+C	1324	2789		LOG'R ROD:		1281	2788	
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=	
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=	
BS (BM1)	A+B+C	1114	A-B=		BS (BM1)			A-B=	

Field Staff: CL DS DH
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: _____ Date: _____

Project #: 13-4-0169
Project Name: Mt. Polley

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Overc, 2°C, snow

HID	H-DC-M	Date	23-SEP-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome CK Middle	Q Measurement Start Time:	14:41 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	15:30 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	14:40 (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

Site anchor x 2. Dive point pressure transducers installed at station by AE/AMEC crews.

Channel Measurements

Staff Gauge Height (m):	0.180
Weir Head (m):	—
Water Temperature (°C):	2.7 °C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	879	
Average Q (m^3/s):	0.0933	
Q Meas. Accuracy +/- [%]:	34%	
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 (04 :48)	758.7 | 820	35/40	0.100	20	0.005
2 (15 :00)	759.0 | 827.4	35/40	0.100	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	757.4
CF.T =	5.98×10^{-5}
Qsalt =	0.0933

Notes:
Interval = 2 sec
used 20g/L for SS ?

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	757.4	2.8
2.	20	837.2	2.8
3.	10	841.1	2.8
4.	10	863.5	2.8
5.	10	907	2.8
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) 1440 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	4535	1535	3.000		BM1		1446	3.000	Log'r Rod Length:
BM2		2177	2338		BM2		2108	2338	Log'r Rod to Botm:
BM3		1810	2725		BM3	~~1729~~	1723	2723	
TOS		2040	2495		TOS		1955	2491	
WATER		2865	1670		WATER		2774	1672	
LOG'R ROD:		1809	2726		LOG'R ROD:		1721	2725	
HWM/CON					HWM/CON				
BANKFULL					BANKFULL				
BS (BM1)					BS (BM1)				

Field Staff: CL DH DS
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-4-0162
Project Name: Mt. Munson

EDI

Weather: Clear 2°C, frost

HID	H-DCB	Date	23 SEP 2013	Discharge Measurement Instruments + Methods
Station Name	Diversion Channel @ Bridge	Q Measurement Start Time:	15:18 (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:	15:18 (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

Pumping water from channel @ bridge to pit for dosing using small (1") layflat & small diesel pump.

Channel Measurements

Staff Gauge Height (m):	0.146
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):	880	
Average Q (m^3/s):	0.0271	
Q Meas. Accuracy +/- [%]:	32%	
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 (15:30)	679.8 | 730.7		0.05	20	0.0035
2 (15:32)	679.9 | 730.5				
3 (:)	|				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	500
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	2.3×10^{-4}
Qsalt =	0.0276

Notes: 2 sec recording intervals

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 0	677.6	2.5
2. 20	691.4	2.3
3. 20	721.3	2.3
4. 20	741.3	2.3
5. 20	761.0	2.3
6. 20	785.1	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) 15:42 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	4243	1243	3.000		BM1	4200	1200	3.000	Log'r Rod Length:	
BM2	A-B+C		A-B=		BM2		0845	A-B=	Log'r Rod to Botm:	
BM3	A+B+C	1300	2943		BM3		1205	2995		
TOS	A+B+C	1899	2344		TOS		1852	A-B=		
WATER	A+B+C	2740	1503		WATER		2694	1506		
LOG'R ROD:	A+B+C	1386	2857		LOG'R ROD:		1343	2857		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DM DS
Data Entry By: CL Date: 26 Sept 2013
Reviewed By: Date:

Project #: 12-4-0167
Project Name: Mt. Hanson

EDI

Weather: Clear, 25, Snow

HID	H-DC u2	Date	23 Sept 2013	Discharge Measurement Instruments + Methods
Station Name	Dorne creek Upper 2	Q Measurement Start Time:	16:20 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	16:37 (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]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]

Site Comments

Site unchanged from previous visit. Very complex braided channel through porous media

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:	SS	
Measurment ID (MID):	881	
Average Q (m^3/s):	0.0034	
Q Meas. Accuracy +/- [%]:	29%	
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 (16:23)	817.0 | 8627	~27	0.025	20	
2 (16:28)	812.2 | 3531	~27	0.025	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	=1/Csec*Qs
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~1~~ 500 mL
SPC_0 Calib. Tank	
CF.T =	4.22×10^{-4}
Qsalt =	0.0074

Notes:
1 see second interval

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	856.2	2.0
2.	20 mL	882.8	2.0
3.	20 mL	897.0	2.0
4.	20 mL	917.0	2.1
5.	20 mL	936.0	2.0
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 station (instant)

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

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A+B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B+C		A-B=		BM2			A-B=	Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3			A-B=		
TOS	A+B+C		A-B=		TOS			A-B=		
WATER	A+B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DS DH
Data Entry By: CL Date: 20 Sept 2013
Reviewed By: Date:

Project #: 13-4-067
Project Name: Mt. Rainier

EDI

Weather: Overc, 5°C, Snow

HID	HDC-U1	Date	23-Sep-2013	Discharge Measurement Instruments + Methods
Station Name	Dome Ck U1	Q Measurement Start Time:	16:06 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	16:17 (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

Station anchored from previous visit. Very complex flow pathways.

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:	SS	
Measurment ID (MID):	882	
Average Q (m^3/s):	0.0131	
Q Meas. Accuracy +/- [%]:	28%	
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 (16:06)	743.1 | 849.2	30	0.025	80	0.00125
2 (16:09)	742.6 | 843.	30	0.025	80	0.00125
3 (:)	|				

V_1 for Sec. Mix (mL)	400
Csec (g/L):	1g/L ~~10g/L~~
Vol. Calib. Tank (L):	x 500
SPC_0 Calib. Tank	741.7
CF.T =	3.74 x10⁻⁴
Qsalt =	0.0131

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	741.7	1.8
2.	20	777.1	1.8
3.	20	777.4	1.9
4.	20	799.2	1.9
5.	20	813.5	1.9
6.	40	837.6	1.9
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 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	A+B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B+C		A-B =		BM2			A-B =	Log'r Rod to Botm:	
BM3	A+B+C		A-B =		BM3			A-B =		
TOS	A+B+C		A-B =		TOS			A-B =		
WATER	A+B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DS DH
Data Entry By: CL Date: 26 Sept 2013
Reviewed By: Date:

Project #: 13-4-067
Project Name: Mt. Hansen

EDI

Weather: Over. 2°C, Snow

HID	H-PC-DSP	Date	23 Sep 2013	Discharge Measurement Instruments + Methods
Station Name	Pony Creek Downstream of Rd	Q Measurement Start Time:	1651 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	1706 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	16:52 (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

Site unchanged from previous visit

Channel Measurements

Staff Gauge Height (m):	0.268
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):	883	
Average Q (m^3/s):	0.00492	
Q Meas. Accuracy +/- [%]:	10%	
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 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	≈1/7 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.		
Notes:		7.		
		8.		
		9.		

CF.T

Volum.

Volume (L) =	20	19	20	19	19
Time (sec)	[1] 4.15	[2] 3.95	[3] 3.96	[4] 3.86	[5] 3.80
Average Q (L/s) =	~~4.82~~ 4.82	4.81	5.05	4.92	5.0
Avg. Q_{vol} (L/s) =	4.92		Avg Q_{vol} (m^3/s) =	0.00492	

Hydrometric Levels - Survey

YES \| NO \| REASON: Survey Time (HH:MM): (WATER) 16 52 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	4258	1258	3.000		BM1	4232	1232	3.000	Log'r Rod Length:	
BM2		1043	3215		BM2		1029	3203	Log'r Rod to Botm:	
BM3		0603	3655		BM3		0578	3654		
TOS		1076	3182		TOS		1051	3181		
WATER		1823	2435		WATER		1785	2447		
LOG'R ROD:		0829	3429		LOG'R ROD:		0802	3430		
HWM/CON					HWM/CON					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: CL - DS - DH
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-4-0165
Project Name: Mt. Polley

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Overcast 5°C, Snow

HID	H-PC-4	Date	23 Sep 2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Creek Upper	Q Measurement Start Time:	1715 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	1758 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	1731 (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

Piezo installed @ station, sensor moved d/s of controls.
Kicked up minor silt when removing data logger

Channel Measurements

Staff Gauge Height (m):	0.270
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):	884	
Average Q (m^3/s):	0.0087	
Q Meas. Accuracy +/- [%]:	13%	
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 (17:38)	166.2 | 188.8	20	0.010	20	0.0005
2 (17:46)	163 | 180.0				
3 (:)	——— | ———				

V_1 for Sec. Mix (mL)	=1 / Css 500mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	500mL 250
SPC_0 Calib. Tank	
CF.T =	7.98×10^{-4}
Qsalt =	0.0087
Notes:	

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	164.2	0.9
2.	20mL	192.2	0.9
3.	10mL	191.6	0.9
4.	10mL	200.6	0.9
5.	10mL	204.3	0.9
6.	10mL	211.4	0.9
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) 1721 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	5402	2462	3.000	
BM2	A+B+C	1822	3580	
BM3	A+B+C	1474	3927	
TOS	A+B+C	2165	5237	
WATER	A+B+C	2892	2510	
LOG'R ROD:	A+B+C	1924	3478	
HWM/CON	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	5357	2353	3.000	Log'r Rod Length:	
BM2		1778	3579	Log'r Rod to Botm:	
BM3		1429	3928		
TOS		912.0	3237		
WATER		2848	2509		
LOG'R ROD:		1880	3477		
HWM/CON			A-B=		
BANKFULL			A-B=		
BS (BM1)			A-B=		

Field Staff: CL DH DS
Data Entry By: _____ Date: 30 Sept 2013
Reviewed By: _____ Date: _____

Project #: 13-4-0167
Project Name: Mt. Nansen

EDI

Weather: Snow, 2°C

HID	H-DC-D1b	Date	23-Sep-2013	Discharge Measurement Instruments + Methods
Station Name	Dome Creek D1b	Q Measurement Start Time:	1817 (HH:MM) PDT | PST	(SI) | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	1835 (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

Moderate flow.
* challenging station to measure Q, jumpy SPC

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:	SW	
Measurment ID (MID):	885	
Average Q (m^3/s):	0.025	
Q Meas. Accuracy +/- [%]:	35%	
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

SCUD | 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 (18:18)	1198 | 1270		0.02	20	0.001
2 (18:26)	1130 | 1235				
3 (:)	|				

V_1 for Sec. Mix (mL)	=1 / Css 500
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	XL 500
SPC_0 Calib. Tank	
CF.T =	6.13×10^{-4}
Qsalt =	0.0251

Notes: 2 second logging time
T = 1.6°C ch. time visually turbid to slug

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	1228	1.4
2.	10mL	1234	1.3
3.	10 mL	1242	1.3
4.	10 mL	1250	
5.	10 mL	1263	1.3
6.	20 mL	1270	1.2
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) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A+B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B+C		A-B=		BM2			A-B=	Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3			A-B=		
TOS	A+B+C		A-B=		TOS			A-B=		
WATER	A+B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:			A-B=		
HWM/CON	A+B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DH DS
Data Entry By: CL Date: 30 Sept 2013
Reviewed By: Date:

Project #: 13-Y-0063
Project Name: Mt. Carmen

EDI

Weather: Snow, 2°C

HID	H-QC-DX+105	Date	23 Sept 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX+105	Q Measurement Start Time:	1846 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	1915 (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

* Site not ideal for SS. V. slow/laminar flow due to long standing water on banks + pinforal & volumetric @ pre d/s is a better flow

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:	SS	V
Measurment ID (MID):	886	887
Average Q (m^3/s):	0.0023	0.0013
Q Meas. Accuracy +/- [%]:	27%	10%
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

SLUG | CONSTANT RATE | DRY | LOGGED | MANUAL | SEC/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 (18:55)	792.0 | 820.3		0.01	20	0
2 (19:06)	794.0 | 819.4		0.01	20	
3 (:)	|				

			Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1/Css 500		1. 0	798.0	0.3
Csec (g/L):	1 g/L		2. 10 mL	805.0	0.3
Vol. Calib. Tank (L):	~~1~~ 500		3. 10 mL	806.3	0.3
SPC_0 Calib. Tank	798.0		4. 10 mL	814.0	0.3
CF.T =	1.47×10^{-3}		5. 10 mL	815.7	0.2
Qsalt =	0.0023		6. 10 mL	820.2	0.2
			7. 10 mL	823.9	0.2
			8.		
			9.		

CF.T

Notes: 5 seconds

T=0.3°C

Volum.

Volume (L) =	17	20	20	20	20
Time (sec)	[1] 12.68	[2] 15.16	[3] 14.93	[4] 13.25	[5] 15.29
Average Q (L/s) =	1.34	1.31	1.34	1.31	1.31
Avg. Q_{vol} (L/s) =	1.322		Avg Q_{vol} (m^3/s) =	0.0013	

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER)

BM Shift: Yes| No

Logger Shift: Yes| No

Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A=B+C		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A=B+C		A-B=		BM2			A-B=	Log'r Rod to Botm:	
BM3	A=B+C		A-B=		BM3			A-B=		
TOS	A=B+C		A-B=		TOS			A-B=		
WATER	A=B+C		A-B=		WATER			A-B=		
LOG'R ROD:	A=B+C		A-B=		LOG'R ROD:			A-B=		
HWM/CON	A=B+C		A-B=		HWM/CON			A-B=		
BANKFULL	A=B+C		A-B=		BANKFULL			A-B=		
BS (BM1)	A=B+C		A-B=		BS (BM1)			A-B=		

Field Staff: CL DH DS.
Data Entry By: CL Date: 30 Sept. 2013
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

EDI ENVIRONMENTAL DYNAMICS INC.

Field Dates: JULY 16-17, 2013

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	[M]	0167-1307 16 - 016	WQ-SEEP	Seepage	LT50 this trip	13.07.16	15:36
2	[M]	0167-1307 16 - 021	WQ-TP	Tailings Pond		13.07.16	15:52
3	[M]	0167-1307 16 - 011	WQ-DC-DX+105	DX+200/105		13.07.16	18:20
4	[M]	0167-1307 17 - 022	WQ-DC-DX	Dome Creek at DX		13.07.17	9:34
5	[M]	0167-1307 16 - 020	WQ-DC-U	Upper Dome		13.07.16	15:20
6	[M]	0167-1307 16 - 010	WQ-DC-D1b	Dome Creek D1b		13.07.16	17:56
7	[M]	0167-1307 16 - 017	WQ-DC-U1	Dome Creek 1		13.07.16	16:09
8	[M]	0167-1307 16 - 015	WQ-DC-U2	Dome Creek 2		13.07.16	16:10
9	[M]	0167-1307 16 - 005	WQ-DC-R	Dome Creek at Road		13.07.16	10:26
10	[M]	0167-1307 - N/A	WQ-ADIT SEEP	Adit seep	dry, no samples photo 2651-53	13.07.16	N/A
11	[M]	0167-1307 16 - 009	WQ-MS-S-03	Mill Seep 03		13.07.16	18:20
12	[M]	0167-1307 - N/A	WQ-MS-S-08	Mill Seep 08	Dry no samples photos 0292-94	13.07.17	N/A
13	[M]	0167-1307 16 - 006	WQ-VC-U	Upper Victoria Creek		13.07.16	11:50
14	[M]	0167-1307 16 - 013	WQ-VC-REF	Victoria Creek Reference		13.07.16	13:40

Field Staff: BSm, JM, DS

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

ENVIRONMENTAL DYNAMICS INC.

Field Dates: JULY 16-17, 2013

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
						yy.mm.dd	HH:MM
15	[✓]	0167-1307 16 - 001	WQ-VC-R	Victoria Creek at Road		13.07.16	8:11
16	[✓]	0167-1307 16 - 007	WQ-VC-DBC	Victoria Creek D/S Back Creek		13.07.16	11:40
17	[✓]	0167-1307 16 - 003	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		13.07.16	9:15
18	[✓]	0167-1307 16 - 012	WQ-BC	Back Creek		13.07.16	12:28
19	[✓]	0167-1307 16 - 004	WQ-MN	Minnesota Creek		13.07.16	8:39
20	[ ]	0167-1307 17 -030	WQ-PW	Pumphouse Well	Drinking Water Package + YG Bottle	13.07.17	11:42
21	[✓]	0167-1307 16 - 014	WQ-PC-U	Pony Creek upstream		13.07.16	16:50
22	[✓]	0167-1307 16 - 019	WQ-PC-D	Pony Creek downstream		13.07.16	16:38
23	[✓]	0167-1307 17 - 026	WQ-DRY	Dry Creek Reference	Summer Sample Required	13.07.17	9:56
24	[✓]	0167-1307 17 - 024	WQ-PIT1	pit top		13.07.17	8:41
25	[✓]	0167-1307 17 - 025	WQ-PIT2	pit middle		13.07.17	8:54
26	[✓]	0167-1307 17 - 023	WQ-PIT3	pit bottom		13.07.17	8:45
27	[✓]	0167-1307 16 - 002	Field Replicate 1	WQ-MN		13.07.16	9:32
28	[✓]	0167-1307 16 - 018	Field Replicate 2	DC-U		13.07.16	15:20
29	[ ]	0167-1307 field Blank	Field Blank			13.07.17	10:15
30	[ ]	TRAVEL BLANK	Travel Blank			-	-

Field Staff: BSm, TM, DS

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 1 of ___

YSI Calibrated ? (Yes) / No

Weather: partly cloudy, light wind, ~16°C

Field Samplers: BSm, JM, DS

Date / Time: 16 JULY 2013, 7:30

Site Information	
Site Name:	WQ - VCR
Sample Identifier:	0167-1307 16 - 001
Sample Date and Time:	16 JULY 2013, 8:11
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.5°C
Specific Conductivity (SPC):	270.3
pH:	7.38
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0141
	Downstream:	0142
	Overview:	0143
	Datasheet:	0144

Site Information	
Site Name:	WQ - MN
Sample Identifier:	0167-1307 16 - 004
Sample Date and Time:	16 JULY 13 8:39
Replicate ID (if applicable)	0167-130716-002
Field Measured Parameters	
Temperature:	5.3°C
Specific Conductivity (SPC):	110.6
pH:	7.26
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0145
	Downstream:	0146
	Overview:	0147
	Datasheet:	0148

Site Information	
Site Name:	WQ - VC - UMN
Sample Identifier:	0167-1307 16 - 003
Sample Date and Time:	16 JULY 13 9:15
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	8.0°C
Specific Conductivity (SPC):	288.8
pH:	7.68
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0154
	Downstream:	0155
	Overview:	0156
	Datasheet:	0162

Site Information	
Site Name:	WQ - DCR
Sample Identifier:	0167-1307 16 - 005
Sample Date and Time:	16 JULY 13 10:26
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	9.1°C
Specific Conductivity (SPC):	1242
pH:	7.65
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0163
	Downstream:	0164
	Overview:	0165
	Datasheet:	0166

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 **Weather:** partly cloudy, ~18°C **Field Samplers:** BSm, DS, JM

Project Name: Mount Nansen Water Quality

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YSI Calibrated? (Yes) / No **Date / Time:** _____

Site Information	
Site Name:	WQ-VC-DBC
Sample Identifier:	0167-1307 16 - 007
Sample Date and Time:	16 JULY 2013 11:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.6°C
Specific Conductivity (SPC):	213.3
pH:	7.67
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0172
	Downstream:	0173
	Overview:	0174
	Datasheet:	0175

Site Information	
Site Name:	WQ-VC-U
Sample Identifier:	0167-1307 16 - 006
Sample Date and Time:	16 JULY 13 11:50
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.5°C
Specific Conductivity (SPC):	206.1
pH:	7.52
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0176
	Downstream:	0177
	Overview:	0178
	Datasheet:	0179

Site Information	
Site Name:	WQ-BC
Sample Identifier:	0167-1307 16 - 012
Sample Date and Time:	16 JULY 2013 12:28
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	14.8°C
Specific Conductivity (SPC):	342.6
pH:	8.25
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0185
	Downstream:	0186
	Overview:	0187
	Datasheet:	0191

Site Information	
Site Name:	WQ-VC-REF
Sample Identifier:	0167-1307 16 - 013
Sample Date and Time:	16 JULY 2013 13:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	10.6°C
Specific Conductivity (SPC):	208.3
pH:	7.74
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0191
	Downstream:	0192
	Overview:	0194
	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: overcast, light rain, ~16 °C.

Field Samplers: BSm, JM, DS

Date / Time: ____

Site Information	
Site Name:	WQ - DC-U
Sample Identifier:	0167-1307 16 -020
Sample Date and Time:	16 JULY 2013 15:20
Replicate ID (if applicable)	0167-130716-018
Field Measured Parameters	
Temperature:	14.2°C
Specific Conductivity (SPC):	1386
pH:	7.97
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0200
	Downstream:	0201
	Overview:	0202
	Datasheet:	0203

Site Information	
Site Name:	WQ - SEEP
Sample Identifier:	0167-1307 16 - 016
Sample Date and Time:	16 JULY 2013 15:36
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	9.4°C
Specific Conductivity (SPC):	1672
pH:	6.90
Turbidity:	N/A
Site Conditions	
flow level:	light
turbidity (clear, light, mod, high):	mod - high
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	
LTSD	Downstream:	/
	Overview:	0204
	Datasheet:	

Site Information	
Site Name:	WQ - TP
Sample Identifier:	0167-1307 16 - 021
Sample Date and Time:	16 JULY 2013 15:52
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	17.5°C
Specific Conductivity (SPC):	1254
pH:	8.38
Turbidity:	N/A
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0221
	Downstream:	0222
	Overview:	0223
	Datasheet:	0227

Site Information	
Site Name:	WQ - DC - U2
Sample Identifier:	0167-1307 16 - 015
Sample Date and Time:	16 JULY 2013 16:10
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.4
Specific Conductivity (SPC):	1256
pH:	7.71
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0231
	Downstream:	0232
	Overview:	0233
	Datasheet:	0234

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: over cast with thunder clouds, rain, mod wind ~16°C

Field Samplers: BSm DS, JH

Date / Time: _____

Site Information	
Site Name:	WQ - DC - U1
Sample Identifier:	0167-1307 16 - 017
Sample Date and Time:	16JULY 2013 16:09
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.9°C
Specific Conductivity (SPC):	1227
pH:	7.53
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0236
	Downstream:	0235
	Overview:	0237
	Datasheet:	0238

Site Information	
Site Name:	WQ - DC - D
Sample Identifier:	0167-1307 16 - 019
Sample Date and Time:	16JULY 2013 16:38
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.9°C
Specific Conductivity (SPC):	592.8
pH:	6.79
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0243
sampling done ~6m d/s of reg. site due to creek going to ground @ reg site (no flow, dry) - surphwins 0247-50	Downstream:	0244
	Overview:	0245
	Datasheet:	0246

Site Information	
Site Name:	WQ - PC - U
Sample Identifier:	0167-1307 16 - 014
Sample Date and Time:	16JULY 2013 16:50
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.1°C
Specific Conductivity (SPC):	468.5
pH:	6.45
Turbidity:	N/A
Site Conditions	
flow level:	none
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness) no visible flow, sampled from small pond near reg. sample site. (lots of moss - water seeping through it?)	Upstream:	0257
	Downstream:	0258
	Overview:	0254
	Datasheet:	0259

Site Information	
Site Name:	WQ - DC - D16
Sample Identifier:	0167-1307 16 - 010
Sample Date and Time:	16 JULY 2013 17:56
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.0°C
Specific Conductivity (SPC):	1462
pH:	7.89
Turbidity:	N/A
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:	0261
	Downstream:	0260
	Overview:	0262
	Datasheet:	0263

Field Blank ID _____

Trip Blank ID _____

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page 5 of ____
YSI Calibrated? Yes / No
Weather: overcast, mod rain, ~14°C
Field Samplers: BSm, JM, DS
Date / Time: ____

Site Information	
Site Name:	WQ - MS - S - 03
Sample Identifier:	0167-1307 16 - 009
Sample Date and Time:	16 JULY 16 18:20
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.6
Specific Conductivity (SPC):	1256
pH:	7.32
Turbidity:	N/A
Site Conditions	
flow level:	low - mod
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0268
	Downstream:	0269
	Overview:	0270
	Datasheet:	0271

Site Information	
Site Name:	WQ - DX - 1105
Sample Identifier:	0167-1307 16 - 011
Sample Date and Time:	16 JULY 2013 18:20
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.8 °C
Specific Conductivity (SPC):	1239
pH:	6.95
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0276
	Downstream:	0277
	Overview:	0279
	Datasheet:	0280

Site Information	
Site Name:	
Sample Identifier:	0167-1307 -
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:	0167-1307 -
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:** Overcast, ~14°C **Field Samplers:** KM, JM, DS

Project Name: Mount Nansen Water Quality

Page ____ of ____

YSI Calibrated? (Yes) / No **Date / Time:** 17 JULY 2013, 7AM

Site Information		Site Information	
Site Name:	Pit top WQ - PIT1 Top	Site Name:	WQ - PIT2 Middle
Sample Identifier:	0167-1307 17 - 024	Sample Identifier:	0167-1307 17 - 025
Sample Date and Time:	17 JULY 2013 8:41	Sample Date and Time:	17 JULY 2013 08:54
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		**Field Measured Parameters**	
Temperature:	13.0 °C	Temperature:	12.8 °C
Specific Conductivity (SPC):	1547	Specific Conductivity (SPC):	1552
pH:	7.96	pH:	7.95
Turbidity:	N/A	Turbidity:	N/A
Site Conditions		**Site Conditions**	
flow level:	N/A	flow level:	N/A
turbidity (clear, light, mod, high):	clear	turbidity (clear, light, mod, high):	
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers	Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream:		Upstream:
6m to bottom (max sampling depth)	Downstream:	Sample Depth 2.5 m	Downstream:
	Overview:	DO 8.43 mg/L	Overview:
	Datasheet:		Datasheet:
		Pit photos 0285-87	
DO 8.67 mg/L			

Site Information		Site Information	
Site Name:	WQ - PIT3 Bottom	Site Name:	WQ - DC - DX
Sample Identifier:	0167-1307 17 - 023	Sample Identifier:	0167-1307 17 - 027
Sample Date and Time:	17 JULY 2013 8:45	Sample Date and Time:	17 JULY 13 9:34
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		**Field Measured Parameters**	
Temperature:	11.0 °C	Temperature:	3.8°C
Specific Conductivity (SPC):	2462	Specific Conductivity (SPC):	873
pH:	7.00	pH:	7.11
Turbidity:	N/A	Turbidity:	N/A
Site Conditions		**Site Conditions**	
flow level:	N/A	flow level:	low
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers	Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream:		Upstream: 0288
sampled at 5m	Downstream:		Downstream: 0289
DO 7.56	Overview:		Overview: 0290
	Datasheet:		Datasheet: 0291

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page ___ of ___

YSI Calibrated ? Yes / No

Weather: overcast, ~18°C

Field Samplers: BSm, DS, JM

Date / Time: _____

Site Information	
Site Name:	WQ - DRY
Sample Identifier:	0167-1307 17 - ~~026~~ 026
Sample Date and Time:	17JUL13 9:56
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.2°C
Specific Conductivity (SPC):	377.4
pH:	7.37
Turbidity:	N/A
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0295
	Downstream:	0296
	Overview:	0297
	Datasheet:	0298

Site Information	
Site Name:	WQ ~~DRY~~ PW
Sample Identifier:	0167-1307 17 - 030
Sample Date and Time:	130717 11:43
Replicate ID (if applicable)	✓
Field Measured Parameters	
Temperature:	2.6
Specific Conductivity (SPC):	426.1
pH:	7.40
Turbidity:	
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	✓

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0299
	Downstream:	
	Overview:	
	Datasheet:	

Site Information	
Site Name:	
Sample Identifier:	0167-1307 -
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:	0167-1307 -
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 #: 13-, 0167
Project Name: Mount Nansen - Water Quality

Field Dates: Aug. 14-15 2013

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	[✓]	0167-1308 14 - 011 ✓	WQ-SEEP	Seepage	No LT50 167 130814 -016 rep	13.08.14	13:21
2	[✓]	0167-1308 14 - 012 ✓	WQ-TP	Tailings Pond		13.08.14	13:30
3	[✓]	0167-1308 14 - 015 ✓	WQ-DC-DX+105	Dome Creek at DX+105		13.08.14	16:01
4	[✓]	0167-1308 14 - ~~015~~ 019 ✓	WQ-DC-DX	Dome Creek at DX		13.08.14	16:07 *
5	[✓]	0167-1308 14 - 021 ✓	WQ-DC-U	Upper Dome		13.08.14	12:26
6	[✓]	0167-1308 14 - 022 ✓	WQ-DC-D1b	Dome Creek D1b		13.08.14	15:13
7	[✓]	0167-1308 14 - 013 ✓	WQ-DC-U1	Upper Dome Creek 1		13.08.14	13:44
8	[✓]	0167-1308 14 - 014 ✓	WQ-DC-U2	Upper Dome Creek 2		13.08.14	13:53
9	[✓]	0167-1308 14 - 006 ✓	WQ-DC-R	Dome Creek at Road		13.08.14	9:23
10	[ ]	~~0167-1308 -~~	~~WQ-ADIT SEEP~~	~~Adit seep~~	~~DRY~~	13.08.___	~~___~~
11	[✓]	0167-1308 14 - 017 ✓	WQ-MS-S-03	Mill Seep 03	REP - 0167 - 130814 - 016 ✓	13.08.14	15:51
12	[✓]	0167-1308 14 - 003 ✓	WQ-MS-S-08	Mill Seep 08		13.08.14	15:40
13	[✓]	0167-1308 14 - 024 ✓	WQ-VC-U	Upper Victoria Creek		13.08.14	10:23?
14	[✓]	0167-1308 14 - 026 ✓	WQ-VC-REF	Victoria Creek Reference		13.08.14	11:29

Field Staff: DS, JM CL

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: Aug. 14-15, 2014

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
						yy.mm.dd	HH:MM
15	[✓]	0167-1308 14 - 007 ✓	WQ-VC-R	Victoria Creek at Road		13.08.14	7:32
16	[✓]	0167-1308 14 - 023 ✓	WQ-VC-DBC	Victoria Creek D/S Back Creek		13.08.14	10:04
17	[✓]	0167-1308 14 - 002 ✓	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		13.08.14	8:45
18	[✓]	0167-1308 14 - 025 ✓	WQ-BC	Back Creek		13.08.14	10:45
19	[✓]	0167-1308 14 - 005 ✓	WQ-MN	Minnesota Creek		13.08.14	8:15
20	[✓]	0167-1308 15 - 030	WQ-PW	Pumphouse Well	Drinking Water Package + ~~YG Bottle~~ - no bottle b/c Friday!	13.08.15	8:30
21	[✓]	0167-1308 14 - 008 ✓	WQ-PC-U	Pony Creek upstream		13.08.14	14:~~22~~24
22	[✓]	0167-1308 14 - 009 ✓	WQ-PC-D	Pony Creek downstream		13.08.14	14:12
23	[ ]		WQ-DRY	Dry Creek Reference		-	-
24	[✓]	0167-1308 14 - 027	WQ-PIT-1	pit top		13.08.14	17:00
25	[✓]	0167-1308 14 - 028	WQ-PIT-2	pit middle		13.08.14	17:29
26	[✓]	0167-1308 14 - 029	WQ-PIT-3	pit bottom		13.08.14	17:45
27	[ ]	0167-1308 14 - 010	Field Replicate 1	WQ-SEEP		13.08.14	13:21
28	[ ]	0167-1308 14 - D16	Field Replicate 2	WQ-MS-F03		13.08.14	15:51
29	[ ]	0167-1308 -	Field Blank			13.08.__	
30	[ ]	TRAVEL BLANK	Travel Blank			-	-

Field Staff: JM DS C

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated? (Yes) / No

Weather: clear, ~20°C

Field Samplers: CL JH DS

Date / Time: 14 AUG 2013 7:32

Site Information	
Site Name:	WQ-VC-R
Sample Identifier:	0167-1308 14 - 190814-007
Sample Date and Time:	14 AUG 2013 7:32
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.9
Specific Conductivity (SPC):	221.4
pH:	7.97
Turbidity:	4.13 NTU
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	clear, low turbidity
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
V. low flow - GR observed downstream of culvert	Upstream:	0451
	Downstream:	0452
	Overview:	0453
	Datasheet:	

Site Information	
Site Name:	WQ-MN
Sample Identifier:	0167-1308 14 - 005
Sample Date and Time:	14 AUG 2013 8:15
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.3°C
Specific Conductivity (SPC):	85.2
pH:	7.89
Turbidity:	15.4 NTU
Site Conditions	
flow level:	Low to moderate
turbidity (clear, light, mod, high):	light turbidity
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
Sample collected in usual location. One bottle previously labelled 004 was to carried error mistake. Relabelled to "005"	Upstream:	0459
	Downstream:	0460
	Overview:	0461
	Datasheet:	

Site Information	
Site Name:	WQ-VC-UMN
Sample Identifier:	0167-1308 14 - 002
Sample Date and Time:	14 AUG 2013 8:45
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.6
Specific Conductivity (SPC):	238.8
pH:	7.88
Turbidity:	3.21
Site Conditions	
flow level:	Low to moderate
turbidity (clear, light, mod, high):	light turbidity
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
GR observed @ sample site	Upstream:	0467
	Downstream:	0468
	Overview:	0469
	Datasheet:	

Site Information	
Site Name:	WQ-DC-R
Sample Identifier:	0167-1308 14 - 006
Sample Date and Time:	14 AUG 2013 09:23
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.3°C
Specific Conductivity (SPC):	1168
pH:	7.73
Turbidity:	49.3 NTU
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	mod. turbidity
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
	Upstream:	0470
	Downstream:	0471
	Overview:	0472
	Datasheet:	

Field Blank ID: FIELD BLANK

Trip Blank ID: TRAVEL BLANK

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated ? (Yes) / No

Weather: Sun, 15°C

Field Samplers: CL, JM, DS

Date / Time: 14 AUG 2013 6:50

Site Information	
Site Name:	WQ-JC-DBC
Sample Identifier:	0167-1308 14 - 023
Sample Date and Time:	14 AUG 2013 10:04
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.0
Specific Conductivity (SPC):	194.2
pH:	7.77
Turbidity:	1.78 NTU
Site Conditions	
flow level:	low to moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
Cool + calm, near baseflow.	Upstream:	0478
	Downstream:	0479
	Overview:	0480
	Datasheet:	

Site Information	
Site Name:	WQ-JC-U
Sample Identifier:	0167-1308 14 - 024
Sample Date and Time:	14 AUG 2013
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	6.0
Specific Conductivity (SPC):	182.6
pH:	7.74
Turbidity:	1.68
Site Conditions	
flow level:	Low to moderate
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
No comments	Upstream:	0481
Lots of berries at site	Downstream:	0482
	Overview:	0483
	Datasheet:	

Site Information	
Site Name:	WQ-BC
Sample Identifier:	0167-1308 14 - 025
Sample Date and Time:	14 AUG 2013 10:45
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	9.3°C
Specific Conductivity (SPC):	336.8
pH:	8.31
Turbidity:	1.41
Site Conditions	
flow level:	LOW
turbidity (clear, light, mod, high):	clear to light
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
No comment. Site unchanged since previous visit.	Upstream:	0494
	Downstream:	0495
	Overview:	0496
	Datasheet:	

Site Information	
Site Name:	WQ-JC-REF
Sample Identifier:	0167-1308 14 - 026
Sample Date and Time:	14 AUG 2013 11:29
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.3°C
Specific Conductivity (SPC):	185.3
pH:	7.3°C
Turbidity:	1.59 NTU
Site Conditions	
flow level:	Low to moderate, base flow?
turbidity (clear, light, mod, high):	clear to light
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
No. comments.	Upstream:	0497
	Downstream:	0498
	Overview:	0499
	Datasheet:	

Field Blank ID: FIELD BLANK

Trip Blank ID: TRAVEL BLANK

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated? Yes / No

Weather: Sun 25°C

Field Samplers: CK JM

125

Date / Time: 14 AUG 2013

Site Information	
Site Name:	WQ-DC-U
Sample Identifier:	0167-13014 - 021
Sample Date and Time:	14 AUG 2013 12:36
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	13.2°C
Specific Conductivity (SPC):	1361
pH:	8.06
Turbidity:	22.8
Site Conditions	
flow level:	Low to moderate
turbidity (clear, light, mod, high):	Light to moderate
ice thickness (if applicable)	None
Notes (if pit incl. DO and ice thickness)	Site unchanged from previous visit. Orange/Brown staining on substrate.
Photo Numbers	Upstream: 0507; Downstream: 0508; Overview: 0509; Datasheet:

Site Information	
Site Name:	4-SEEP/WQ-SEEP
Sample Identifier:	0167-13014 - 011
Sample Date and Time:	14 AUG 2013 13:21
Replicate ID (if applicable)	0167-13014 - 010
Field Measured Parameters	
Temperature:	9.2
Specific Conductivity (SPC):	1719
pH:	7.39
Turbidity:	54.7 NTU.
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	Moderate
ice thickness (if applicable)	None
Notes (if pit incl. DO and ice thickness)	Slight flow. No need to do hydrocarbon here.
Photo Numbers	Upstream: ; Downstream: ; Overview: 0513; Datasheet:

Site Information	
Site Name:	WQ-TP
Sample Identifier:	0167-13014 - 012
Sample Date and Time:	14 AUG 2013 13:30
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	18.8
Specific Conductivity (SPC):	1309
pH:	8.53
Turbidity:	4.38
Site Conditions	
flow level:	None
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes (if pit incl. DO and ice thickness)	SG @ 0.820
Photo Numbers	Upstream: ; Downstream: ; Overview: 0514; Datasheet: SG: 0515

Site Information	
Site Name:	WQ-DC-U1
Sample Identifier:	0167-13014 - 13
Sample Date and Time:	14 AUG 2013 1344
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	9.7
Specific Conductivity (SPC):	1262
pH:	7.86
Turbidity:	2.03
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	None
Notes (if pit incl. DO and ice thickness)	
Photo Numbers	Upstream: 0516; Downstream: 0519; Overview: 0518; Datasheet:

Field Blank ID: FIELD BLANK

Trip Blank ID: TRAVEL BLANK

Project No.: 13-Y-0167 Weather: Overcast 25°C Field Samplers: CL DS JM

Project Name: Mount Nansen Water Quality

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YSI Calibrated ? Yes / No Date / Time: 14 AUG 2013

Site Information	
Site Name:	WQ-PC-U2
Sample Identifier:	0167-1308 14 - 014
Sample Date and Time:	14 AUG 2013 13:53
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	8.6
Specific Conductivity (SPC):	1181
pH:	7.77
Turbidity:	60.3 NTU
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	mod
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
No comment / changes	Upstream:	0519
Some high ode / plant debris / detritus floating DS.	Downstream:	0520
	Overview:	0521
	Datasheet:	

Site Information	
Site Name:	WQ-PC-DS
Sample Identifier:	0167-1308 14 - 009
Sample Date and Time:	14 AUG 2013 14:12
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.1
Specific Conductivity (SPC):	482.3
pH:	7.25
Turbidity:	0.95 NTU
Site Conditions	
flow level:	low / v. low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
0522 - Dirt scoop 1 PC u DS - no water	Upstream:	0523
	Downstream:	0524
	Overview:	0525
	Datasheet:	

Site Information	
Site Name:	WQ-PC-U
Sample Identifier:	0167-1308 14 - 008
Sample Date and Time:	14 AUG 2013 14:24
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	8.3
Specific Conductivity (SPC):	~~880~~ 376.0
pH:	7.48
Turbidity:	4.57
Site Conditions	
flow level:	v. low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
v. low flow, glary ice is dropping in elevation	Upstream:	0526
	Downstream:	0527
	Overview:	0528
	Datasheet:	

Site Information	
Site Name:	WQ-PC-D16
Sample Identifier:	0167-1308 14 - 022
Sample Date and Time:	14 AUG 2013 15:13
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	10.5
Specific Conductivity (SPC):	1433
pH:	8.10
Turbidity:	8.01 NTU
Site Conditions	
flow level:	(low)
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
	Upstream:	0529
	Downstream:	0530
	Overview:	
	Datasheet:	

Field Blank ID FIELD BLANK

Trip Blank ID TRAVEL BLANK

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated? (Yes) / No

Weather: Overcast, 25°C

Field Samplers: CL JH DS

Date / Time: 14 AUG 2013

Site Information	
Site Name:	WQ-MS-S-08
Sample Identifier:	0167-1308 14 - 007
Sample Date and Time:	14 AUG 2013 / 15:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	~~2.5°C~~ 2.5
Specific Conductivity (SPC):	1591
pH:	7.42
Turbidity:	4.12
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers
V. low flow low temp. Obvious seep - GW showing @ source.	Upstream: 0531
	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ-MS-S-03
Sample Identifier:	0167-1308 14 - 017
Sample Date and Time:	14 AUG 2013 15:51
Replicate ID (if applicable)	~~FD1~~ 167-1308-016
Field Measured Parameters	
Temperature:	2.9°C
Specific Conductivity (SPC):	1264
pH:	7.04
Turbidity:	562 NTU
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers
no comments. Replicate taken.	Upstream: 0535
	Downstream: 0536
	Overview: 0537
	Datasheet:

Site Information	
Site Name:	~~FB~~ WQ-DC-DX+105
Sample Identifier:	0167-1308 14 - 015
Sample Date and Time:	14 AUG 2013 16:01
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.8°C
Specific Conductivity (SPC):	1227
pH:	~~8~~ 7.06
Turbidity:	3.11
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	v. clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: 0532
	Downstream: 0533
	Overview: 0534
	Datasheet:

Site Information	
Site Name:	WQ-DC-DY
Sample Identifier:	0167-1308 14 - 6
Sample Date and Time:	14 AUG 2013 16:07
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	~5.3~
Specific Conductivity (SPC):	4761
pH:	7.55
Turbidity:	39.3
Site Conditions	
flow level:	v. low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Probe in v little water and temperature maybe skewed	Upstream: 0548
	Downstream: 0549
	Overview: 0540
	Datasheet: —

Field Blank ID: FIELD BLANK

Trip Blank ID: TRAVEL BLANK

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated ? (Yes) / No

Weather: Over Cast Calm + 20

Field Samplers: DS/SM/CL

Date / Time: 07:00 130814

Site Information	
Site Name:	WQ - PIT - 01 (Surface)
Sample Identifier:	0167-1307 14 - 027
Sample Date and Time:	17:00 130814
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	15.3
Specific Conductivity (SPC):	1610
pH:	8.13
Turbidity:	2.79 DO = 80.0%
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Surface	Upstream:
Depth @ sample location 5 m	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ Pit 02 (Bottom)
Sample Identifier:	0167-1307 14 - 028
Sample Date and Time:	14 AUG 2013 17:29
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	14°C
Specific Conductivity (SPC):	1606
pH:	7.20
Turbidity:	0.79 DO% = 69.8
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Depth 5 m	Upstream:
	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ - PIT - ~~15m~~ 03 (mid)
Sample Identifier:	0167-1307 14 - 29
Sample Date and Time:	14 AUG 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	14.7
Specific Conductivity (SPC):	1295
pH:	8.02
Turbidity:	1.23 DO: 98.1%
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Sampled @ 2.5 m	Upstream:
	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ - Pump House
Sample Identifier:	0167-1308 15 - 030
Sample Date and Time:	15-AUG-2013 8:30
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	14
Specific Conductivity (SPC):	370.9
pH:	7.90
Turbidity:	0.53
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
NO DW Bacteriology sample collected. Friday - not accepting samples	Upstream:
	Downstream:
	Overview:
	Datasheet:

Field Blank ID: FIELD BLANK

Trip Blank ID: TRAVEL BLANK

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: Sept. 24-25 2013

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
						yy.mm.dd	HH:MM
15	[✓]	0167-130924-025	WQ-VC-R	Victoria Creek at Road		13.09.24	7:48
16	[✓]	0167-130924-011	WQ-VC-DBC	Victoria Creek D/S Back Creek		13.09.24	11:29
17	[✓]	0167-130924-024	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		13.09.24	?
18	[✓]	0167-130924-014	WQ-BC	Back Creek		13.09.24	13:37
19	[✓]	0167-130924-023	WQ-MN	Minnesota Creek		13.09.24	8:27
20	[ ]	0167-130925-030	WQ-PW	Pumphouse Well	Drinking Water Package + YG Bottle	13.09.25	7:53
21	[✓]	0167-130924-009	WQ-PC-U	Pony Creek upstream		13.09.24	14:29
22	[✓]	0167-130924-012	WQ-PC-D	Pony Creek downstream		13.09.24	14:15
23	[✓]	0167-130924-003	WQ-DRY	Dry Creek Reference		13.09.24	17:25
24	[✓]	0167-130824-029	WQ-PIT-1	pit top	record DO in mg/L	13.09.24	1845
25	[✓]	0167-130824-027	WQ-PIT-2	pit middle	record DO in mg/L	13.09.24	1852
26	[✓]	0167-130824-028	WQ-PIT-3	pit bottom	record DO in mg/L	13.09.24	1900
27	[✓]	0167-130924-008	Field Replicate 1	WQ-PC-D	~~FIELD~~ WQ-PC D	13.09.24	1415
28	[✓]	0167-130924-015	Field Replicate 2	WQ-SEEP	WQ-SEEP	13.09.24	1540
29	[✓]	0167-130924-	Field Blank		"FIELD BLANK"	13.09.24	1800
30	[✓]	TRAVEL BLANK	Travel Blank		"TRAVEL BLANK"	1309-24	XXX

Field Staff: CL DH DS

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: Sept. 24-25 2013

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	☑	0167-130924-017	WQ-SEEP	Seepage	rep 015 LT50 samples	13.09.24	1540
2	☑	0167-130924-018	WQ-TP	Tailings Pond		13.09.24	1500
3	☑	0167-130924-006	WQ-DC-DX+105	Dome Creek at DX+105		13.09.24	16:29
4	☑	0167-130924-004	WQ-DC-DX	Dome Creek at DX		13.09.24	17:09
5	☑	0167-130924-013	WQ-DC-U	Upper Dome		13.09.24	1440
6	☑	0167-130924-019	WQ-DC-D1b	Dome Creek D1b		13.09.24	16:45
7	☑	0167-130924-020	WQ-DC-U1	Upper Dome Creek 1		13.09.24	15:10
8	☑	0167-130924-016	WQ-DC-U2	Upper Dome Creek 2		13.09.24	15:10
9	☑	0167-130924-026	WQ-DC-R	Dome Creek at Road	*sample is labed "Any" 08"	13.09.24	10:30
10	☑	0167-1309——	WQ-ADIT SEEP	Adit seep	N/A - non-existent	13.09.~~24~~	——
11	☑	0167-1309——	WQ-MS-S-03	Mill Seep 03	N/A - site re-graded.	13.09.~~24~~	——
12	☑	0167-130924-021	WQ-MS-S-08	Mill Seep 08	~~N/A~~	13.09.24	16:27
13	☑	0167-130924-022	WQ-VC-U	Upper Victoria Creek		13.09.24	11:46
14	☑	0167-130924-010	WQ-VC-REF	Victoria Creek Reference		13.09.24	1301

Field Staff: CL DS DH

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page 1 of 5
YSI Calibrated? (Yes) / No

Weather: Cold -2°C Snow

Field Crew: CL DA DS

Date / Time: 24 Sep 2013 6:30

Site Information	
Site Name:	WQ-DC-U1
Sample Identifier:	0167-1309 24 - 020
Sample Date and Time:	24 Sep 2013 15:10
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.1
SPC:	811.7
pH:	7.61
Turbidity:	—
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear to light
ice thickness (if applicable):	—

Notes (if pit incl. DO and Ice thickness)	Photo Numbers	
~~DO~~	Upstream:	0791
	Downstream:	0792
	Overview:	0793
	Datasheet:	

Site Information	
Site Name:	WQ-DC-U2
Sample Identifier:	0167-1309 24 - 016
Sample Date and Time:	24-Sep-2013 15:10
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.3
SPC:	942
pH:	7.40
Turbidity:	light to moderate
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light to moderate
ice thickness (if applicable):	

Notes (if pit incl. DO and Ice thickness)	Photo Numbers	
DO: 13.79 mg/L	Upstream:	0794
	Downstream:	0795
	Overview:	0796
	Datasheet:	

Site Information	
Site Name:	WQ-SEEP
Sample Identifier:	0167-1309 24 - 017
Sample Date and Time:	24 Sep 2013 15:40
Replicate ID (if applicable)	0167-1309 24-015
Field Measured Parameters	
Temperature:	3.4
SPC:	1691
pH:	6.93
Turbidity:	clear-light
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light
ice thickness (if applicable):	—

Notes (if pit incl. DO and Ice thickness)	Photo Numbers	
Intake ~150.	Upstream:	0798
Total pit - 200.818 cubic	Downstream:	↓
43798.7 m³	Overview:	
	Datasheet:	

Site Information	
Site Name:	WQ-MS-S-08
Sample Identifier:	0167-1309 24 - 021
Sample Date and Time:	24 Sep 2013 16:27
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.3
SPC:	1173
pH:	7.16
Turbidity:	clear
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	
"Ditch" excavated &	Upstream:	0799
cleaned by excavator	Downstream:	0800
	Overview:	0801
	Datasheet:	

Field Blank ID: FIELD BLANK

Trip Blank ID: TRIP BLANK

Project No.: 13-Y-0167 Weather: Orn, -2°C, Snow Field Crew: CL DH DJ

Project Name: Mount Nansen Water Quality

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YSI Calibrated? Yes / No Date / Time: 24 Sep 2013 6:30

Site Information	
Site Name:	WQ-PLD
Sample Identifier:	0167-1309 24 - 012
Sample Date and Time:	24-SEP-2013 14:15
Replicate ID (if applicable)	0167-1309 24 - 008
Field Measured Parameters	
Temperature:	1.3
SPC:	277.6
pH:	7.31
Turbidity:	clear to moderate
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light
ice thickness (if applicable):	none but snow

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	779
DO = 13.44 mg/L	Downstream:	780
	Overview:	781
	Datasheet:	

Site Information	
Site Name:	WQ-PC-U
Sample Identifier:	0167-1309 24 - 009
Sample Date and Time:	24 Sep 2013 14:29
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.6
SPC:	233.3
pH:	7.30
Turbidity:	Light
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable):	none but snow.

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0783
DO = 13.41 mg/L	Downstream:	
	Overview:	
	Datasheet:	

Site Information	
Site Name:	WQ-DC-U
Sample Identifier:	0167-1309 24 - 013
Sample Date and Time:	24 Sep 2013 1440
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.4
SPC:	850.9
pH:	7.40
Turbidity:	—
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	Moderate
ice thickness (if applicable):	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0784
DO = 13.67 mg/L	Downstream:	0785
	Overview:	0786
	Datasheet:	

Site Information	
Site Name:	WQ-TP
Sample Identifier:	0167-1309 24 - 018
Sample Date and Time:	24 Sep 2013 1500
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	3.9
SPC:	1273
pH:	7.73
Turbidity:	clear - Light
Site Conditions	
flow level:	Nickle
turbidity (clear, light, mod, high):	clear - Light
ice thickness (if applicable):	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	788
DO = 12.07 mg/L	Downstream:	
new SG installed	Overview:	
SG = 0.755 m.	Datasheet:	

Field Blank ID FIELD BLANK

Trip Blank ID TRIP BLANK

Project No.: 13-Y-0167 Weather: Overn. -11°C, snow Field Crew: CL DS DM

Project Name: Mount Nansen Water Quality

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YSI Calibrated? Yes / No Date / Time: Sept 24 2013

Site Information	
Site Name:	WQ-VC-R
Sample Identifier:	0167-1309 24 - 025
Sample Date and Time:	24 Sept 2013 7:48
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.0°C
SPC:	159.8 us/cm
pH:	8.2
Turbidity:	
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light-to moderate
ice thickness (if applicable):	None, but snow!

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
Broke turb meter when drying the lid and now vial V b/c in backup.	Upstream:	0730
	Downstream:	0731
	Overview:	0732
	Datasheet:	

Site Information	
Site Name:	WQ - MN
Sample Identifier:	0167-1309 24 - 023
Sample Date and Time:	24 Sept. 2013 8:27
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.6°C
SPC:	51.8
pH:	7.65
Turbidity:	
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	moderate.
ice thickness (if applicable):	None, but snow.

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
	Upstream:	
	Downstream:	
	Overview:	
	Datasheet:	

Site Information	
Site Name:	WQ-VC-UMN
Sample Identifier:	0167-1309 24 - 024
Sample Date and Time:	24 Sept.
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.2
SPC:	180.0
pH:	7.42
Turbidity:	—
Site Conditions	
flow level:	mod.
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable):	non, snow

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
no DO = 14.24 mg/L	Upstream:	745
	Downstream:	746
	Overview:	747
	Datasheet:	

Site Information	
Site Name:	WQ-DCR
Sample Identifier:	0167-1309 24 - 026
Sample Date and Time:	24 Sept @ 10:30
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.5°C
SPC:	731.7
pH:	7.21
Turbidity:	—
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable):	none, but snow

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
DO = 14.69 mg/L	Upstream:	7749
	Downstream:	0750
	Overview:	0751
Bottle date "08" → August not Sept.	Datasheet:	

Field Blank ID FIELD BLANK Trip Blank ID TRIP BLANK

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
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YSI Calibrated? (Yes) / No

Weather: -2°C, snow on ground, cloudy
Field Crew: CL, DH, DS
Date / Time: Sept. 24/2013 6:30

Site Information	
Site Name:	WQ - VC - DBC
Sample Identifier:	0167-1309 24 - 011
Sample Date and Time:	24 Sept. 2013 11:29
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.4°C
SPC:	150.5
pH:	7.34
Turbidity:	
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable):	N/A. Snow on ground

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Photos on DH Camera	Upstream: 2357+2359
	Downstream: 2358
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ - VCU
Sample Identifier:	0167-1309 24 - 023
Sample Date and Time:	Sept. 24 /2013 11:46
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.4°C
SPC:	138.6
pH:	7.38
Turbidity:	
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	light
ice thickness (if applicable):	N/A. Snow on ground

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Photos on DH Camera.	Upstream: 2361
	Downstream: 2360
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ - VC - Ref
Sample Identifier:	0167-1309 24 - 010
Sample Date and Time:	24 Sept. 2013 13:01
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.9°C
SPC:	136.9
pH:	7.42
Turbidity:	
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	light to moderate.
ice thickness (if applicable):	N/A.

Notes (if pit incl. DO and ice thickness)	Photo Numbers
*Photos on DH camera	Upstream: 2364
	Downstream: 2365
	Overview: 2366
	Datasheet:

Site Information	
Site Name:	WQ - BC
Sample Identifier:	0167-1309 24 - 014
Sample Date and Time:	24 - Sept. 2013 13:37
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.3°C
SPC:	270.5
pH:	7.67
Turbidity:	
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	light.
ice thickness (if applicable):	NA. Snow on ground.

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: 774
	Downstream: 775
DO: 13.13 mg/L	Overview: 776
	Datasheet:

Field Blank ID: FIELD BLANK
Trip Blank ID: TRIP BLANK

Project No.: 13-Y-0167 Weather: Cld -2 Snow Field Crew: A DH DS

Project Name: Mount Nansen Water Quality

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YSI Calibrated? (Yes) / No Date / Time: Sept 24 2013 6:30

Site Information	
Site Name:	WQ PIT 1
Sample Identifier:	0167-1309 24 - 029
Sample Date and Time:	24 Sep 2013 1845
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.2
SPC:	1694
pH:	7.73
Turbidity:	clear - light
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	
ice thickness (if applicable):	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
DO = 10.16 mg/L	Upstream:
Depth = 0.5m (surface)	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	PIT 2
Sample Identifier:	0167-1309 24 - 027
Sample Date and Time:	24 Sep 2013 1852
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.1
SPC:	1817
pH:	6.96
Turbidity:	clear light
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable):	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
DO = 9.44 mg/L	Upstream:
Depth = 3.0 m	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ PIT 3
Sample Identifier:	0167-1309 24 - 028
Sample Date and Time:	24 Sep 2013 1900
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.8
SPC:	2664
pH:	6.66
Turbidity:	clear - light
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable):	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
Depth = 6.2	Upstream:
DO = 5.98	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ-PW
Sample Identifier:	0167-1309 25 - 030
Sample Date and Time:	25 Sep 2013 7:53
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	2.0
SPC:	344.4
pH:	8.22
Turbidity:	clear
Site Conditions	
flow level:	mod.
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable):	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers
DO = 19.66 mg/L	Upstream:
	Downstream:
	Overview:
	Datasheet:

Field Blank ID FIELD BLANK Trip Blank ID TRIP BLANK

EDI
ENVIRONMENTAL DYNAMICS INC.

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page ___ of ___
YSI Calibrated? ☑ / No
Weather: Overcast, -2°C, snow
Field Crew: CL DS DH
Date / Time: 24 Sep 2013 6:30

Site Information	
Site Name:	WQ-DX+105
Sample Identifier:	0167-1309 24 - 006
Sample Date and Time:	24 Sep 2013 16:24
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.8 °C
SPC:	929.3
pH:	6.93
Turbidity:	clear
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable):	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
DO: 11.03 mg/L	Upstream:	0802
	Downstream:	0805
	Overview:	0804
	Datasheet:	

Site Information	
Site Name:	WQ-DIb
Sample Identifier:	0167-1309 24 - 019
Sample Date and Time:	24 Sep 2013 16:45
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.5
SPC:	1235
pH:	7.61
Turbidity:	clear
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear to light
ice thickness (if applicable):	ice forming

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
DO = 13.76 mg/L	Upstream:	0805
	Downstream:	0806
	Overview:	0802
	Datasheet:	

Site Information	
Site Name:	WQ-DX
Sample Identifier:	0167-1309 24 - 004
Sample Date and Time:	24 Sep 2013 17:09
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.2
SPC:	472.4
pH:	7.65
Turbidity:	clear
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	mod - light
ice thickness (if applicable):	none

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
2 piezo's driven into bed @ DX.	Upstream:	0808
	Downstream:	0809
	Overview:	0810
	Datasheet:	

Site Information	
Site Name:	WQ-DRY
Sample Identifier:	0167-1309 24 - 003
Sample Date and Time:	24 Sep 2013 17:25
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.6
SPC:	348.5
pH:	7.55
Turbidity:	clear
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable):	0.05 cm

Notes (if pit incl. DO and ice thickness)	Photo Numbers	
	Upstream:	0812
	Downstream:	0813
	Overview:	0814
	Datasheet:	

Field Blank ID: FIELD BLANK2
Trip Blank ID: TRIP BLANK

APPENDIX D Q2 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 Q1 (April 1) through Q2 (September 30), 2013.

HID	Monitoring Start	Q1 Measurements		Q2 Measurements		Logger Type	Rating Curve Status	Hydrometric Survey	Method
		# Discharge	# Rating	# Discharge	# Rating				
ATM-DC-2	N/A	N/A	N/A	N/A	N/A	HOBO	N/A	No	N/A
ATM-DC-3	N/A	N/A	N/A	N/A	N/A	HOBO	N/A	No	N/A
ATM-DC-4	N/A	N/A	N/A	N/A	N/A	Solinst	N/A	No	N/A
H-PC-U	01-May-12	7	5	3	3	Solinst	Preliminary	Yes	SS,V
H-PC-DSP	07-Jun-11	6	5	3	3	HOBO	Preliminary	Yes	SS, V
H-DC-DX	01-May-12	5	N/A	3	N/A	HOBO	N/A	No	SS, V
H-DX+105	01-May-12	8	N/A	3	N/A	HOBO	N/A	No	SS, V
H-TP	21-Aug-12	N/A	N/A	N/A	N/A	HOBO	N/A	No	SG
H-SEEP	17-Apr-12	5	N/A	3	N/A	HOBO	N/A	No	V, Flow Meter
H-DC-B	17-Apr-12	6	3	3	3	Solinst	Preliminary	Yes	SS
H-DC-M	17-Apr-12	7	5	3	3	Solinst	Preliminary	Yes	SS
H-DC-R	01-May-12	3	2	3	3	Solinst	Preliminary	Yes	ADV, SS, V
H-BC	30-Apr-12	6	6	3	3	HOBO	Preliminary	Yes	ADV, SS
H-MN	17-Apr-12	7	6	3	3	HOBO	Preliminary	Yes	ADV, SS
H-VC-REF	17-Nov-11	6	6	3	3	HOBO	Preliminary	Yes	ADV, SS
H-VC-U	16-Apr-12	8	6	3	3	Solinst	Preliminary	Yes	ADV, SS
H-VC-DBC	17-Apr-12	9	7	3	3	HOBO	Preliminary	Yes	ADV, SS
H-VC-DBC	11-Dec-12	9	7	3	3	Solinst	Preliminary	Yes	ADV, SS
H-VC-UMN	14-Apr-12	9	6	3	3	HOBO	Preliminary	Yes	ADV, SS
H-VC-R	02-May-12	8	6	3	3	Solinst	Preliminary	Yes	ADV, SS

Table D-3 Hydrometric data summary for station visits between April 1, 2013 and September 30, 2013.

Mid	Measurement			Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
	HID	Date (DD/MM/YYYY)	Time (HH:MM)					
742	H-BC	16/05/2013	13:20:00	SS	0.18	0.18	2.082	
760	H-BC	22/05/2013	12:25:00	SS	0.298	0.616	1.926	
770	H-BC	28/05/2013	15:33:00	ADV	0.38	0.2916	2.009	
789	H-BC	11/06/2013	12:42:00	SS	0.26	0.1098	1.925	
810	H-BC	25/06/2013	11:54:00	SS	0.198	0.0173	1.849	
824	H-BC	16/07/2013	12:36:00	SS	0.172	0.0032	1.833	
835	H-BC	14/08/2013	10:45:00	SS	0.191	0.0153	1.68	
871	H-BC	24/09/2013	12:20:00	SS	0.27	0.053	1.931	
719	H-DC-B	06/05/2013	17:00:00	SS		0.022		
732	H-DC-B	15/05/2013	11:20:00	SS		0.1192		B
750	H-DC-B	21/05/2013	14:44:00	SS		0.107		
766	H-DC-B	27/05/2013	15:40:00	SS	0.21	0.304	1.571	
784	H-DC-B	10/06/2013	16:31:00	SS	0.159	0.4269	1.52	
804	H-DC-B	24/06/2013	14:36:00	SS	0.108	0.0206	1.46	
816	H-DC-B	15/07/2013	15:21:00	SS	0.088	0.0158	1.432	
845	H-DC-B	13/08/2013	14:24:00	SS	0.09	0.0051	1.441	
880	H-DC-B	23/09/2013	15:18:00	SS	0.146	0.0276	1.503	
761	H-DC-D1	29/05/2013	11:52:00	SS		0.0117		B
764	H-DC-D1B	29/05/2013	11:11:00	SS		0.0102		B
782	H-DC-D1B	10/06/2013	19:02:00	SS		0.0031		
801	H-DC-D1b	25/06/2013	16:20:00	SS		0.0067		
820	H-DC-D1b	16/07/2013	17:54:00	SS		0.0006		
840	H-DC-D1b	14/08/2013	14:58:00	SS		0.0032		
885	H-DC-D1b	23/09/2013	18:17:00	SS		0.0251		
758	H-DC-DX	21/05/2013	18:25:00	SS		0.003		
762	H-DC-DX	29/05/2013	13:44:00	SS		0.002		
779	H-DC-DX	12/06/2013	12:31:00	SS		0.0019		
780	H-DC-DX	12/06/2013	12:31:00	V		0.0016		
799	H-DC-DX	25/06/2013	17:40:00	V	0.00014			
827	H-DC-DX	16/07/2013	18:00:00	V		0.000016		
888	H-DC-DX	23/09/2013	18:46:00	V		0.0013		
717	H-DC-DX+105	06/05/2013	17:42:00	SS		0.002		
729	H-DC-DX+105	15/05/2013	15:06:00	SS		0.0151		B
730	H-DC-DX+105	15/05/2013	15:06:00	V		0.0073		B
747	H-DC-DX+105	21/05/2013	17:41:00	SS		0.011		B

Mid	Measurement			Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
	HID	Date (DD/MM/YYYY)	Time (HH:MM)					
748	H-DC-DX+105	21/05/2013	17:41:00	V		0.002		B
763	H-DC-DX+105	29/05/2013	12:57:00	SS		0.0249		
781	H-DC-DX+105	11/06/2013	19:17:00	SS		0.0051		
800	H-DC-DX+105	25/06/2013	17:17:00	SS		0.0022		
832	H-DC-DX+105	16/07/2013	18:41:00	SS		0.0017		
850	H-DC-DX+105	13/08/2013	17:57:00	SS		0.003		
886	H-DC-DX+105	23/09/2013	18:46:00	SS		0.0023		
706	H-DC-M	15/04/2013	16:18:00	SS		0.0004		B/E
720	H-DC-M	06/05/2013	15:53:00	NONE				
731	H-DC-M	15/05/2013	10:58:00	SS	0.1308	0.1308	1.762	B
749	H-DC-M	21/05/2013	13:55:00	SS	0.24	0.456	1.707	
767	H-DC-M	27/05/2013	14:30:00	SS	0.332	0.21		
785	H-DC-M	10/06/2013	15:48:00	SS	0.208	0.1039	1.667	
805	H-DC-M	24/06/2013	14:00:00	SS	0.181	0.0189	1.62	
815	H-DC-M	15/07/2013	14:25:00	SS	0.167	0.0094	1.628	
846	H-DC-M	13/08/2013	13:34:00	SS	0.15	0.0073	1.638	
879	H-DC-M	23/09/2013	14:41:00	SS	0.18	0.0733	1.67	
721	H-DC-R	06/05/2013	14:58:00	NONE				
786	H-DC-R	10/06/2013	14:41:00	SS	0.35	0.0641	0.696	
806	H-DC-R	24/06/2013	13:10:00	SS	0.146	0.024	0.44	
823	H-DC-R	15/07/2013	13:27:00	SS	0.085	0.0127	0.364	
847	H-DC-R	13/08/2013	12:50:00	SS	0.103	0.0122	0.401	
877	H-DC-R	23/09/2013	13:45:00	SS	0.285	0.0849	0.571	
802	H-DC-U1	24/06/2013	15:23:00	SS		0.004		
829	H-DC-U1	15/07/2013	16:22:00	SS		0.0015		
844	H-DC-U1	13/08/2013	15:21:00	SS		0.0018		
882	H-DC-U1	23/09/2013	16:06:00	SS		0.0131		
765	H-DC-U2	27/05/2013	16:24:00	SS		0.06		B
783	H-DC-U2	10/06/2013	17:45:00	SS		0.0253		
803	H-DC-U2	24/06/2013	15:55:00	SS		0.0157		
830	H-DC-U2	15/07/2013	17:10:00	SS		0.0061		
843	H-DC-U2	13/08/2013	15:50:00	SS		0.0065		
881	H-DC-U2	23/09/2013	16:20:00	SS		0.0074		
740	H-MN	16/05/2013	08:37:00	ADV		0.3526		B
739	H-MN	16/05/2013	08:37:00	SS		0.0761		B
759	H-MN	22/05/2013	08:44:00	SS	0.918	0.01	1.474	
773	H-MN	28/05/2013	09:56:00	ADV	0.526	0.0865	1.061	

Mid	Measurement			Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
	HID	Date (DD/MM/YYYY)	Time (HH:MM)					
774	H-MN	28/05/2013	09:56:00	SS	0.526	0.048	1.061	
792	H-MN	11/06/2013	09:37:00	SS	0.552	0.1559	1.087	
812	H-MN	25/06/2013	08:16:00	SS	0.424	0.0301	0.965	
818	H-MN	16/07/2013	08:49:00	SS	0.39	0.0182	0.938	
839	H-MN	14/08/2013	08:00:00	ADV	0.43	0.0383	0.985	
875	H-MN	24/09/2013	08:00:00	ADV	0.538	0.1229	1.098	
722	H-PC-DSP	08/05/2013	09:35:00	V		0.000335		
736	H-PC-DSP	15/05/2013	12:41:00	SS	0.328	0.019	2.524	
752	H-PC-DSP	21/05/2013	15:31:00	SS	0.28	0.004	2.472	
778	H-PC-DSP	28/05/2013	18:50:00	SS	0.304	0.016	2.499	
796	H-PC-DSP	12/06/2013	09:46:00	SS	0.234	0.0075	2.405	
798	H-PC-DSP	24/06/2013	17:45:00	V	0.165	0.00068	2.351	
826	H-PC-DSP	16/07/2013	16:51:00	V	0.13	0.0001	2.432	
842	H-PC-DSP	13/08/2013	16:25:00	V	0.149	0.0004	2.329	
883	H-PC-DSP	23/09/2013	16:51:00	V	0.268	0.00492	2.435	
734	H-PC-U	15/05/2013	13:33:00	SS		0.0191		B
735	H-PC-U	15/05/2013	13:33:00	V		0.0028		B
751	H-PC-U	21/05/2013	16:20:00	SS	0.292	0.011	2.465	
776	H-PC-U	27/05/2013	18:26:00	SS	0.355	0.023	2.526	
777	H-PC-U	27/05/2013	18:26:00	V	0.355	0.0014	2.526	
795	H-PC-U	12/06/2013	10:48:00	SS	0.239	0.008	2.577	
797	H-PC-U	24/06/2013	18:07:00	SS	0.173	0.0011	2.432	
817	H-PC-U	15/07/2013	18:15:00	V	0.152	0.00005	2.396	
841	H-PC-U	13/08/2013	17:10:00	SS	0.201	0.0019	2.45	
884	H-PC-U	23/09/2013	17:15:00	SS	0.27	0.0087	2.51	
712	H-SEEP	17/04/2013	12:04:00	V		0.003		B/E
718	H-SEEP	08/05/2013	09:47:00	V		0.0029		
733	H-SEEP	15/05/2013	11:00:00	V		0.0026		
794	H-SEEP	11/06/2013	16:53:00	V		0.0024		
814	H-SEEP	25/06/2013	15:07:00	V		0.00256		
821	H-SEEP	16/07/2013	15:45:00	V		0.0028		
833	H-SEEP	13/08/2013	13:05:00	V	0.4	0.003		
876	H-SEEP	24/09/2013	15:55:00	V		0.00387		
714	H-VC-DBC	16/04/2013	13:45:00	ADV		0.0611		B/E
709	H-VC-DBC	16/04/2013	13:45:00	SS		0.03		B/E
725	H-VC-DBC	07/05/2013	12:18:00	ADV	0.462	0.2095	1.815	
726	H-VC-DBC	07/05/2013	12:18:00	SS	0.426	0.15	1.815	

Mid	Measurement			Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
	HID	Date (DD/MM/YYYY)	Time (HH:MM)					
746	H-VC-DBC	16/05/2013	11:50:00	ADV	0.725	2.6119	2.085	
757	H-VC-DBC	22/05/2013	10:40:00	ADV	0.564	0.801	1.885	
771	H-VC-DBC	28/05/2013	14:05:00	ADV	0.79	2.0798	2.155	
790	H-VC-DBC	11/06/2013	11:10:00	ADV	0.528	0.5649	1.878	
809	H-VC-DBC	25/06/2013	10:30:00	ADV	0.432	0.2298	1.767	
828	H-VC-DBC	16/07/2013	11:00:00	ADV	0.381	0.1136	1.721	
837	H-VC-DBC	14/08/2013	09:53:00	ADV	0.455	0.3128	1.792	
873	H-VC-DBC	24/09/2013	10:50:00	ADV	0.568	0.7848	1.895	
716	H-VC-R	15/04/2013	13:00:00	ADV		0.034		B/E
711	H-VC-R	15/04/2013	13:00:00	SS,		0.04		B/E
727	H-VC-R	06/05/2013	13:05:00	ADV	0.362	0.1218	1.928	
728	H-VC-R	06/05/2013	13:05:00	SS	0.362	0.1	1.928	
745	H-VC-R	15/05/2013	08:15:00	ADV	0.674	3.2075	2.314	
754	H-VC-R	21/05/2013	12:23:00	ADV	0.656	1.221	2.222	
775	H-VC-R	27/05/2013	12:53:00	ADV	0.71	3.5971	2.303	
793	H-VC-R	10/06/2013	13:23:00	ADV	0.55	0.7346	2.114	
813	H-VC-R	24/06/2013	12:02:00	ADV	0.488	0.2888	2.053	
831	H-VC-R	15/07/2013	12:23:00	ADV	0.457	0.1598	2.015	
848	H-VC-R	13/08/2013	11:45:00	ADV	0.5	0.3696	2.07	
878	H-VC-R	23/09/2013	12:30:00	ADV	0.575	0.949	2.136	
707	H-VC-REF	16/04/2013	18:02:00	SS		0.08		B/E
744	H-VC-REF	16/05/2013	14:30:00	ADV	0.801	2.074	2.096	
755	H-VC-REF	22/05/2013	13:43:00	ADV	0.539	0.6792	1.848	
768	H-VC-REF	28/05/2013	16:33:00	ADV	0.87	2.0259	2.208	
787	H-VC-REF	11/06/2013	13:11:00	ADV	0.55	0.5403	1.846	
807	H-VC-REF	25/06/2013	12:01:00	ADV	0.395	0.186	1.696	
825	H-VC-REF	16/07/2013	12:43:00	ADV	0.351	0.1082	1.573	
834	H-VC-REF	14/08/2013	10:55:00	ADV	0.449	0.2789	1.758	
870	H-VC-REF	24/09/2013	12:50:00	ADV	0.604	0.7499	1.927	
713	H-VC-U	16/04/2013	15:59:00	ADV		0.0623		B/E
708	H-VC-U	16/04/2013	15:59:00	SS		0.02		B/E
724	H-VC-U	07/05/2013	14:12:00	ADV	0.145	0.1252	2.036	
743	H-VC-U	16/05/2013	12:33:00	ADV	0.448	2.136	2.329	
756	H-VC-U	22/05/2013	11:30:00	ADV	0.3	0.727	2.174	
769	H-VC-U	28/05/2013	14:51:00	ADV	0.495	2.7011	2.354	
788	H-VC-U	11/06/2013	11:43:00	ADV	0.238	0.4882	2.134	
808	H-VC-U	25/06/2013	11:11:00	ADV	0.169	0.208	2.066	

Mid	Measurement			Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
	HID	Date (DD/MM/YYYY)	Time (HH:MM)					
822	H-VC-U	16/07/2013	11:46:00	ADV	0.125	0.1145	2.028	
836	H-VC-U	14/08/2013	10:20:00	ADV	0.198	0.2783	2.086	
872	H-VC-U	24/09/2013	11:30:00	ADV	0.272	0.7413	2.172	
715	H-VC-UMN	16/04/2013	10:44:00	ADV		0.0585		B/E
710	H-VC-UMN	16/04/2013	10:44:00	SS		0.12		B/E
723	H-VC-UMN	07/05/2013	10:11:00	ADV		0.162		
738	H-VC-UMN	16/05/2013	10:06:00	ADV	0.885	2.0619	1.877	
737	H-VC-UMN	16/05/2013	10:06:00	SS	0.885	1.97	1.877	
753	H-VC-UMN	22/05/2013	09:15:00	ADV	0.685	0.4475	1.615	
772	H-VC-UMN	28/05/2013	10:45:00	ADV	0.965	3.2834	1.931	
791	H-VC-UMN	11/06/2013	09:56:00	ADV	0.711	0.6618	1.692	
811	H-VC-UMN	25/06/2013	08:31:00	ADV	0.634	0.2467	1.602	
819	H-VC-UMN	16/07/2013	09:11:00	ADV	0.594	0.1255	1.572	
838	H-VC-UMN	14/08/2013	08:26:00	ADV	0.65	0.3212	1.631	
874	H-VC-UMN	24/09/2013	10:07:00	ADV	0.745	0.7825	1.72	

Notes:
MID = Measurement ID , unique measurement identifier in the hydrometric database.
HID = Hydrometric ID, unique hydrometric station identifier in hydrometric database.
L.D. = Local datum.
Measurement types: ADV – acoustic Doppler Velocimeter; SS – salt dilution, slug injection; V – volumetric; CM – current meter; W – weir; N – no measurement obtained.
Data Flags: E = Estimated Value, B = Ice Present

Table D-4. Hydrometric survey data summary from April 1 to September 30, 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	3.002	3.036	2.879	2.644	2.082	1.585
H-BC	22/05/2013	13:05	3	3.002	3.037	2.88	2.644	1.924	
H-BC	28/05/2013	16:00	3	3.004	3.037	2.881	2.645	2.009	
H-BC	11/06/2013	13:03	3	2.947	3.038	2.879	2.644	1.925	
H-BC	25/06/2013	12:00	3	3.015	3.05	2.886	2.651	1.849	
H-BC	16/07/2013	13:10	3	3.012	3.063	2.898	2.663	1.833	
H-BC	14/08/2013	10:55	3	3.005	3.059	2.9	2.665	1.86	
H-BC	24/09/2013	12:40	3	3.005	3.055	2.9	2.666	1.93	
H-DC-B	27/05/2013	17:45	3	3.358	2.996	2.526	2.349	1.577	
H-DC-B	10/06/2013	16:41	3	3.357	2.996	2.525	1.773	1.52	
H-DC-B	24/06/2013	14:40	3	3.356	2.994	2.934	2.344	1.46	
H-DC-B	15/07/2013	15:30				2.934		1.432	
H-DC-B	15/07/2013	15:38	3	3.357	2.995		2.351		
H-DC-B	13/08/2013	15:00	3	3.355	2.994	2.853	2.346	1.441	
H-DC-B	23/09/2013	15:42	3		2.943	2.857	2.344	1.503	
H-DC-M	06/05/2013	16:10	6	4.625			4.925	3.262	1.422
H-DC-M	15/05/2013	10:18	3	2.314			2.462	1.762	
H-DC-M	21/05/2013	14:20	3	2.313	2.714	2.688	2.463	1.707	
H-DC-M	10/06/2013	16:00	3	2.311	2.712	2.686	2.46	1.667	
H-DC-M	24/06/2013	14:13	3	2.312	2.712	2.678	2.454	1.62	
H-DC-M	15/07/2013	14:30	3	2.325	2.722	2.689	2.462	1.628	
H-DC-M	13/08/2013	14:06	3	2.34	2.731	2.721	2.49	1.638	
H-DC-M	23/09/2013	14:40	3	2.338	2.725	2.726	2.495	1.67	
H-DC-R	10/06/2013	14:55	3	2.936	2.323	1.693	1.296	0.696	
H-DC-R	24/06/2013	13:26	3	2.939	2.322	2.061	1.284	0.44	
H-DC-R	15/07/2013	13:27	3	2.948	2.317	1.675	1.28	0.364	
H-DC-R	13/08/2013	13:21	3	2.965	2.323	1.697	1.299	0.401	

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-DC-R	23/09/2013	13:45	3	2.95	2.308	1.691	1.294	0.571	
H-MN	22/05/2013	9:15	3	2.322	2.726		1.548	1.474	0.533
H-MN	28/05/2013	9:30	3	2.331	2.725	2.088	1.546	1.061	
H-MN	11/06/2013	10:05	3	2.332	2.717	2.064	1.55	1.087	
H-MN	25/06/2013	8:30	3	2.328	2.711	2.068	1.548	0.965	
H-MN	16/07/2013	8:55	3	2.309	2.708	2.069	1.548	0.938	
H-MN	14/08/2013	8:10	3	2.308	2.705	1.875	1.555	0.985	
H-MN	24/09/2013	8:32	3	2.303	2.704	2.082	1.55	1.098	
H-PC-DSP	15/05/2013	12:41	3	3.216	3.686	3.449	3.2	2.524	2.202
H-PC-DSP	21/05/2013	16:06	3	3.247	3.686	3.448	3.2	2.472	
H-PC-DSP	28/05/2013	19:02	3	3.217	3.675	3.451	3.202	2.499	
H-PC-DSP	12/06/2013	10:06	3	3.216	3.643	3.436	3.186	2.405	
H-PC-DSP	24/06/2013	17:56	3	3.218	3.65	3.43	3.18	2.351	
H-PC-DSP	16/07/2013	17:00	3	3.216	3.651	2.316	3.181	3.432	
H-PC-DSP	13/08/2013	16:45	3	3.214	3.649	3.429	3.181	2.329	
H-PC-DSP	23/09/2013	15:52	3	3.215	3.655	3.429	3.182	2.435	
H-PC-U	21/05/2013	17:00	3	3.56	3.86	3.477		2.465	2.133
H-PC-U	21/05/2013	17:30	3	3.559	3.86	3.421		2.471	
H-PC-U	27/05/2013	18:26	3	3.565	3.866	3.428	3.188	2.526	
H-PC-U	12/06/2013	11:05	3	3.56	3.91	3.479	3.239	2.477	
H-PC-U	24/06/2013	18:30	3	3.574	3.923	3.499	3.257	2.988	
H-PC-U	15/07/2013	18:50	3	3.577	3.926	2.331	3.244	2.396	
H-PC-U	13/08/2013	17:30	3	3.577	3.929	3.483	3.242	2.449	
H-PC-U	23/09/2013	17:21	3	3.58	3.927	3.478	3.237	2.51	
H-VC-DBC	16/04/2013	14:00	3.001	3.027	2.919		2.352		1.316
H-VC-DBC	07/05/2013	13:10	6	6.054	5.836		4.701	3.626	
H-VC-DBC	22/05/2013	11:00	3	3.027	2.917	2.561	2.343	1.885	
H-VC-DBC	28/05/2013	14:05	3	3.027	2.911	2.855	2.335	2.146	
H-VC-DBC	11/06/2013	11:13	3	3.027	2.916	2.556	2.338	1.878	

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-DBC	25/06/2013	10:35	3	3.026	2.912	2.557	2.337	1.767	
H-VC-DBC	16/07/2013	11:15	3	3.026	2.912	2.557	2.338	1.721	
H-VC-DBC	14/08/2013	9:53	3	3.025	2.908	2.555	2.338	1.792	
H-VC-DBC	24/09/2013	11:15	3	3.027	2.903	2.559	2.341	1.894	
H-VC-R	15/04/2013	12:00	3	3.422	3.168		2.56		1.515
H-VC-R	06/05/2013	14:20	6	6.853	6.342		5.122	3.861	
H-VC-R	15/05/2013	14:30	3	3.422	3.169		2.624	2.314	
H-VC-R	16/05/2013	11:50	3	3.027	2.918		2.345	2.085	
H-VC-R	21/05/2013	12:53	3	3.422	3.168		2.625	2.222	
H-VC-R	21/05/2013	13:20	3			2.779	2.559	2.221	
H-VC-R	27/05/2013	13:00	3	3.423	3.171	2.785	2.565	2.303	
H-VC-R	10/06/2013	13:20	3	3.423	3.17	2.79	2.568	2.114	
H-VC-R	24/06/2013	12:40	3	3.424	3.169	2.79	2.568	2.053	
H-VC-R	15/07/2013	12:23	3	3.425	3.17	2.791	2.568	2.015	
H-VC-R	13/08/2013	12:30	3	3.425	3.17	2.791	2.57	2.07	
H-VC-R	23/09/2013	12:30	3	3.415	3.168	2.789	2.518	2.136	
H-VC-REF	16/05/2013	14:30	3	2.968	3.047	2.504	2.31	2.096	1.209
H-VC-REF	22/05/2013	13:30	3	2.967	3.046	2.502		1.848	
H-VC-REF	28/05/2013	16:50	3	2.967	3.048	2.535	2.303	2.208	
H-VC-REF	11/06/2013	13:25	3	2.966	3.043	1.829	2.303	2.258	
H-VC-REF	25/06/2013	12:40	3	2.964	3.041	2.573	2.302	1.696	
H-VC-REF	16/07/2013	13:29	3	2.973	3.045	1.664	2.307	1.573	
H-VC-REF	14/08/2013	11:40	3	2.983	3.044	2.624	1.322	1.758	
H-VC-REF	24/09/2013	13:17	3	2.988	3.039	2.636	2.33	1.927	
H-VC-U	16/04/2013	17:00	3	3.362	3.244		2.888		1.309
H-VC-U	07/05/2013	15:05	3	3.364	3.254		2.887	2.036	
H-VC-U	16/05/2013	12:33	3	3.363	3.244		2.889	2.329	
H-VC-U	22/05/2013	12:20	3	3.362	3.244	3.135	2.889	2.174	
H-VC-U	28/05/2013	15:28	3	3.363	3.24	3.134	2.889	2.304	

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	11/06/2013	12:41	3	3.16	3.243	3.137	2.892	2.134	
H-VC-U	25/06/2013	11:20	3	3.361	3.247	3.144	2.897	2.066	
H-VC-U	16/07/2013	12:20	3	3.363	3.248	3.146	2.9	2.028	
H-VC-U	14/08/2013	10:27	3	3.36	3.243	3.145	2.899	2.086	
H-VC-U	24/09/2013	11:35	3	3.357	3.243	3.143	2.897	2.172	
H-VC-UMN	16/05/2013	10:06	3	3.007	2.678	2.199	1.983	1.877	0.973
H-VC-UMN	21/05/2013	9:51	3	3.006	2.679	2.198	1.99	1.615	
H-VC-UMN	28/05/2013	11:45	3	3.006	2.677	2.201	1.986	1.931	
H-VC-UMN	11/06/2013	10:30	3	3.007	2.678	2.203	1.983	1.692	
H-VC-UMN	25/06/2013	9:18	3	3.007	2.678	2.203	1.984	1.602	
H-VC-UMN	16/07/2013	9:48	3	3.008	2.677	1.203	1.986	1.572	
H-VC-UMN	14/08/2013	8:30	3	3.005	2.676	2.209	1.989	1.631	
H-VC-UMN	24/09/2013	10:07	3	2.999	2.642	2.203	2.035	1.72	

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 1 to September 30, 2013.

HID	Measurement Date		Method	Discharge	
	Date	Time		m^3/s	L/s
H-SEEP	17/04/2013	12:04	V	0.003	3
H-SEEP	08/05/2013	09:47	V	0.003	2.9
H-SEEP	15/05/2013	11:00	V	0.003	2.6
H-SEEP	11/06/2013	16:53	V	0.002	2.4
H-SEEP	25/06/2013	15:07	V	0.003	2.56
H-SEEP	16/07/2013	15:55	V	0.003	2.8
H-SEEP	13/08/2013	13:05	V	0.003	3.0
H-SEEP	24/09/2013	15:55	V	0.004	3.8

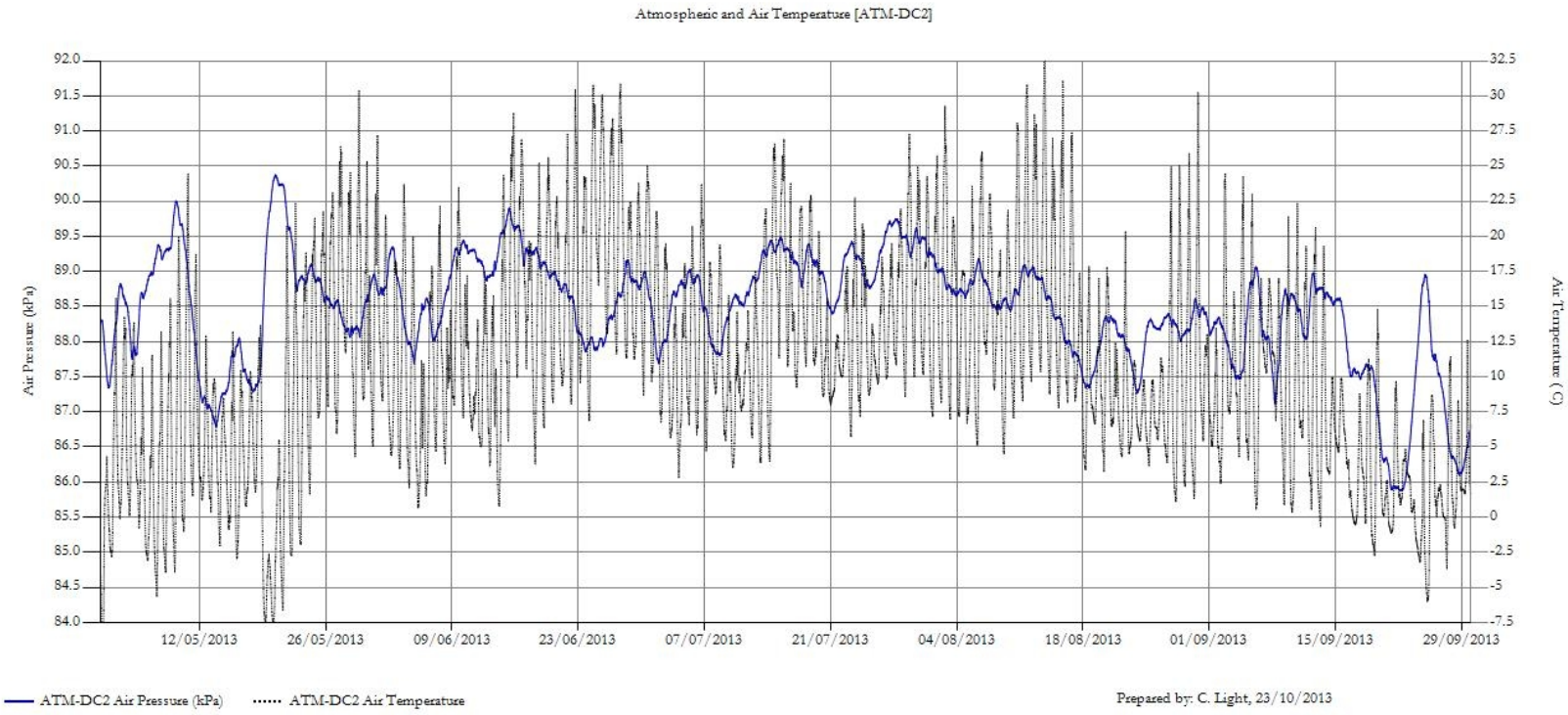

Figure D-1. ATM-DC2 atmospheric pressure and air temperature.

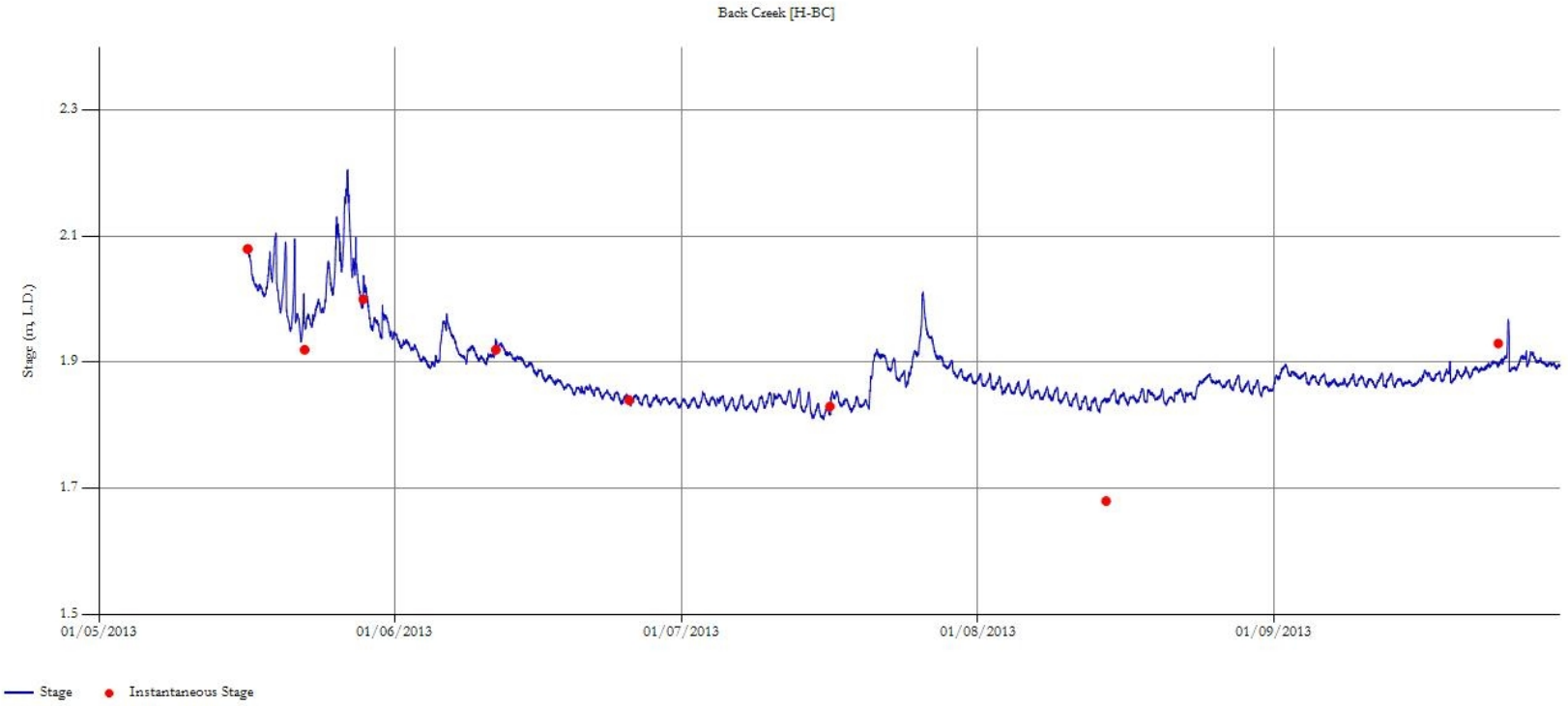

Figure D-2. H-BC stage.

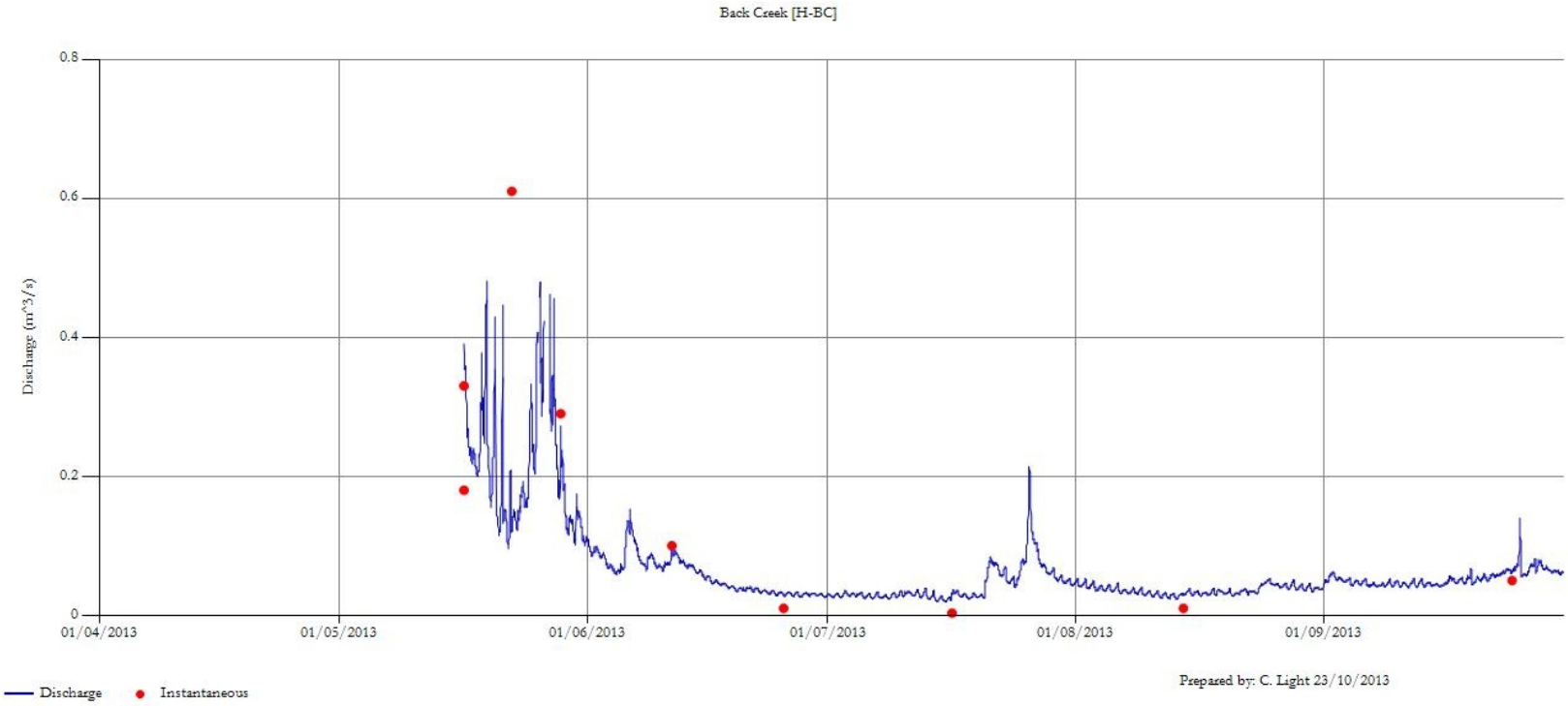

Figure D-3. H-BC hydrograph.

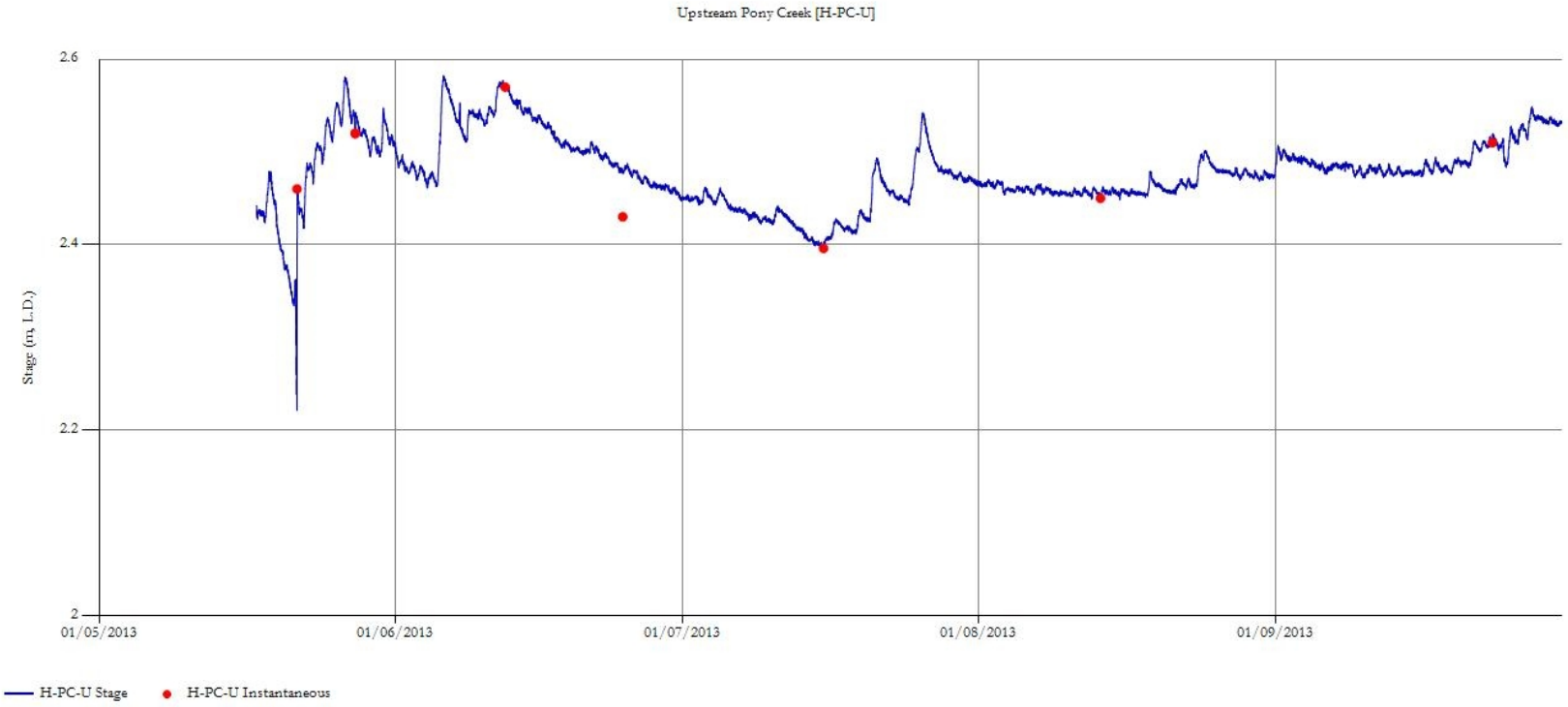

Figure D-4. H-PC-U stage.

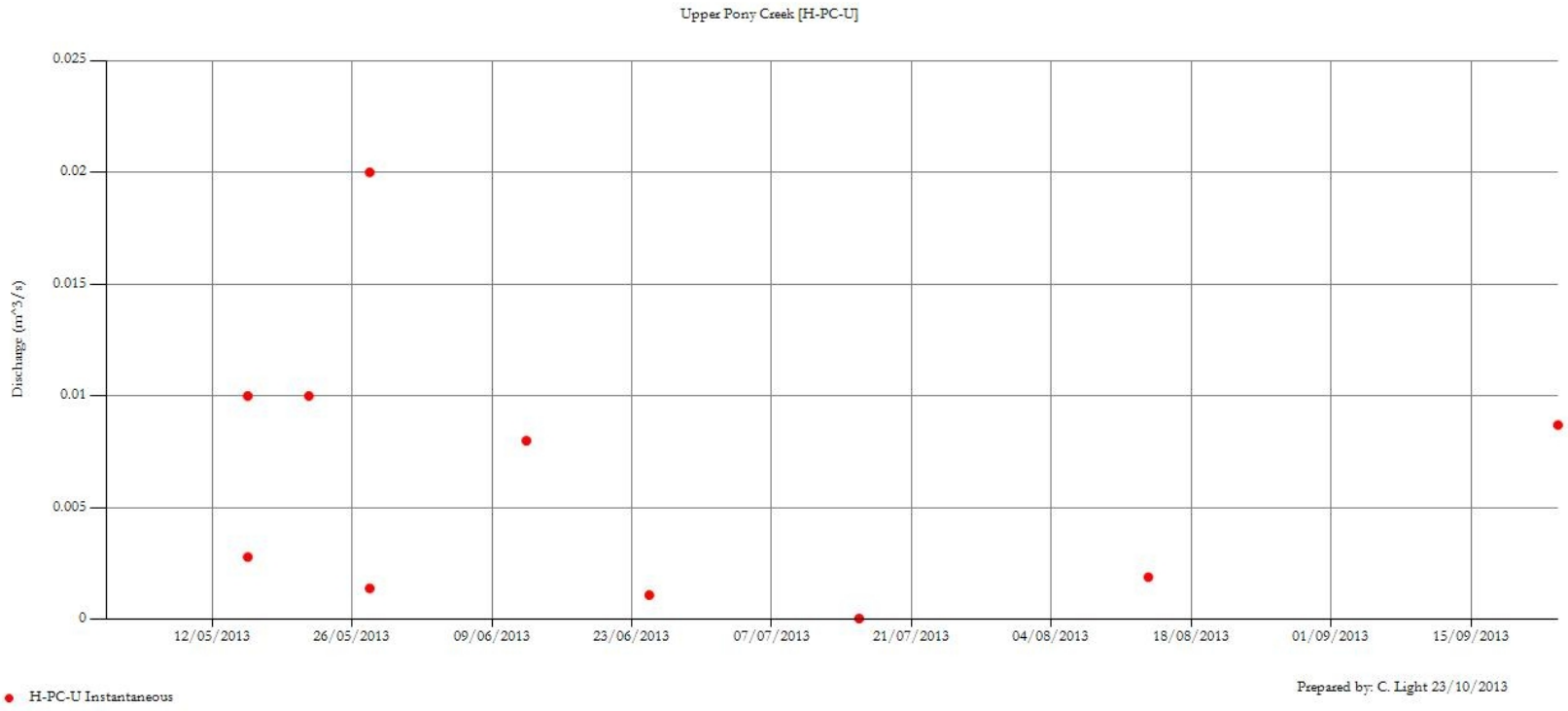

Figure D-5. H-PC-U instantaneous discharge.

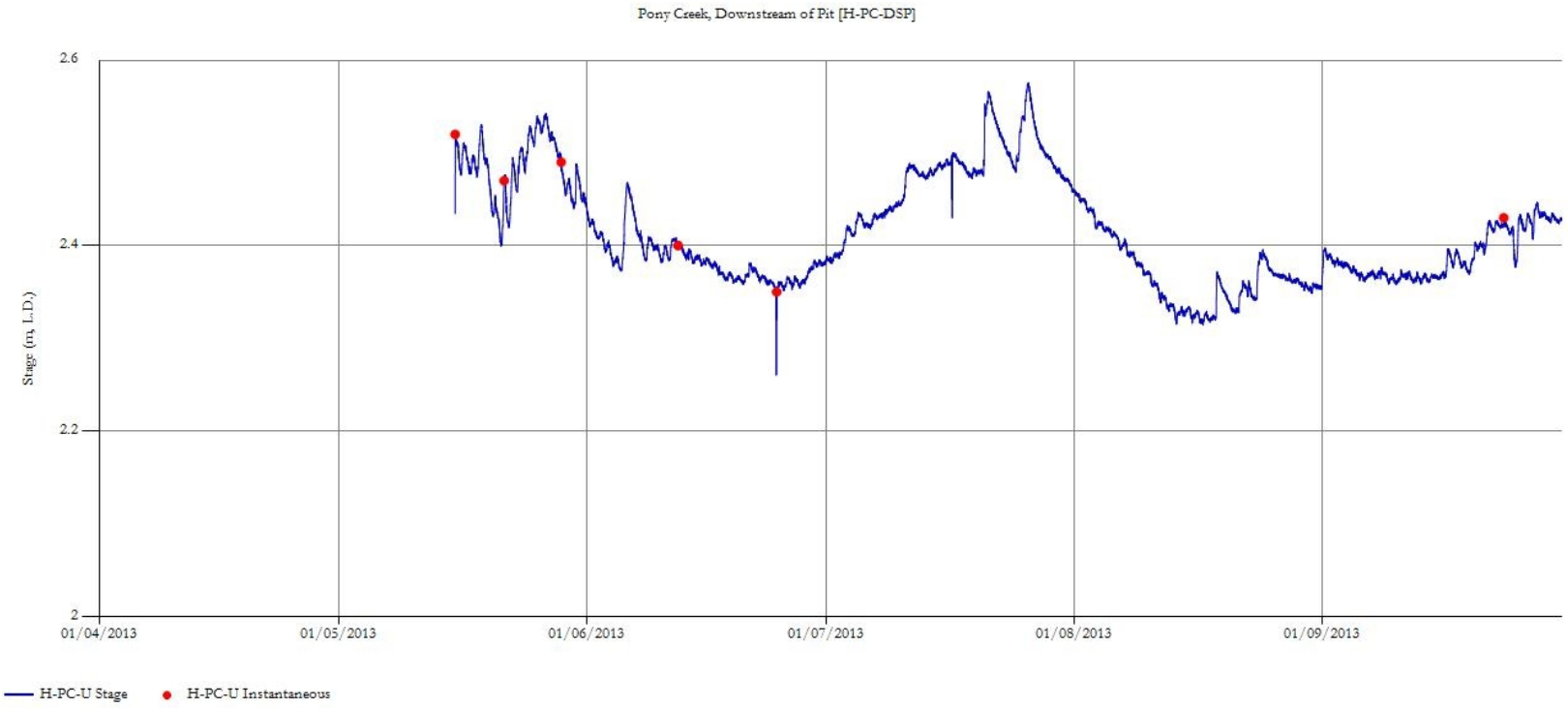

Figure D-6. H-PC-DSP stage.

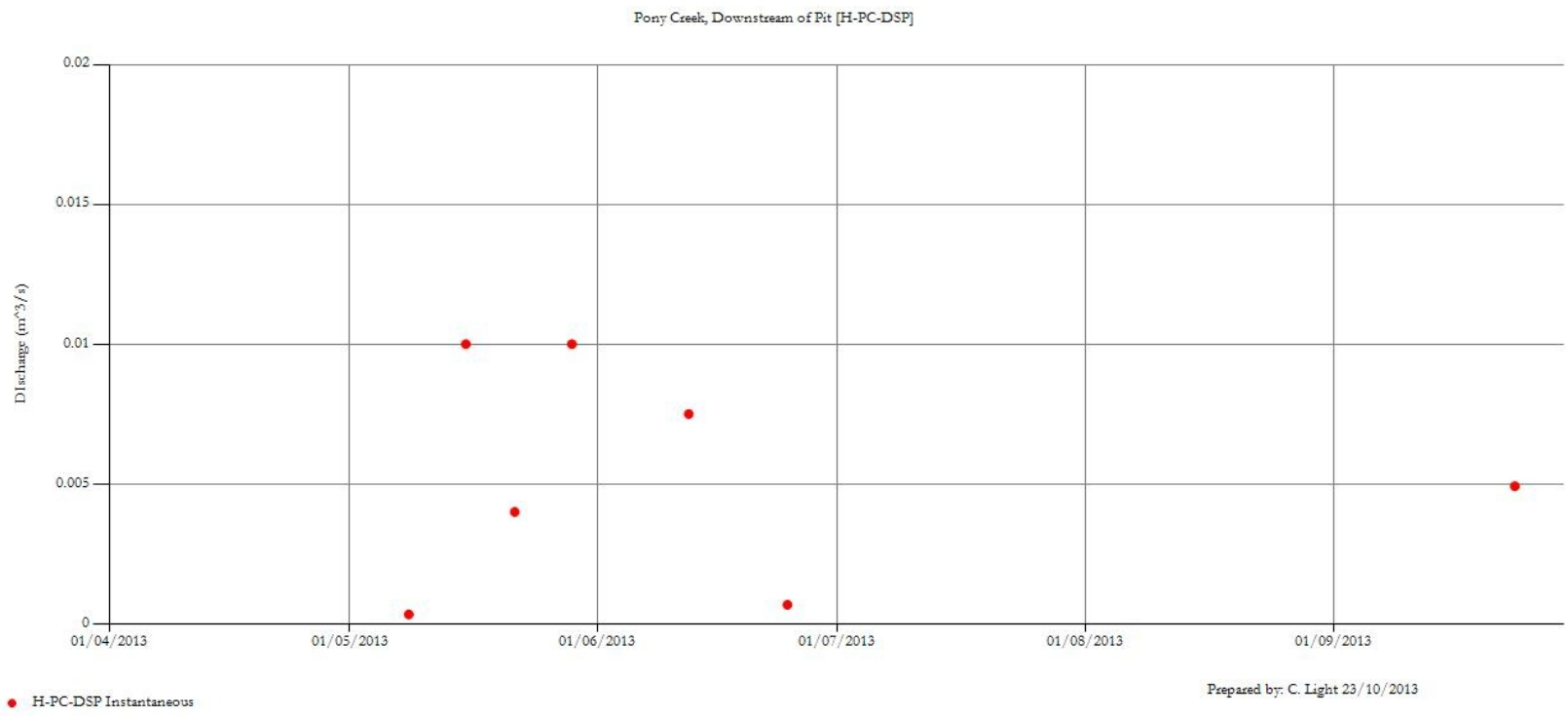

Figure D-7. H-PC-DSP instantaneous discharge.

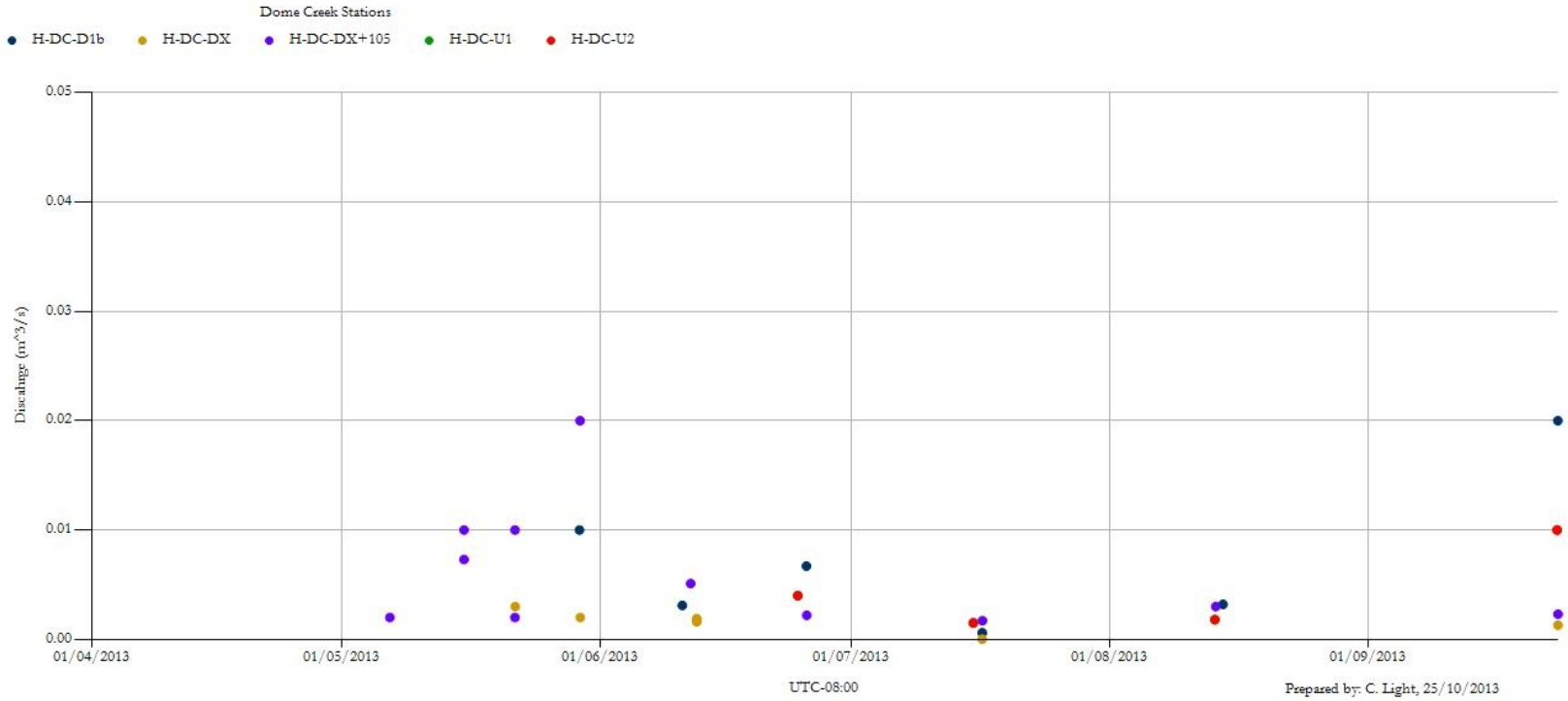

Figure D-8. Upper Dome Creek instantaneous discharge.

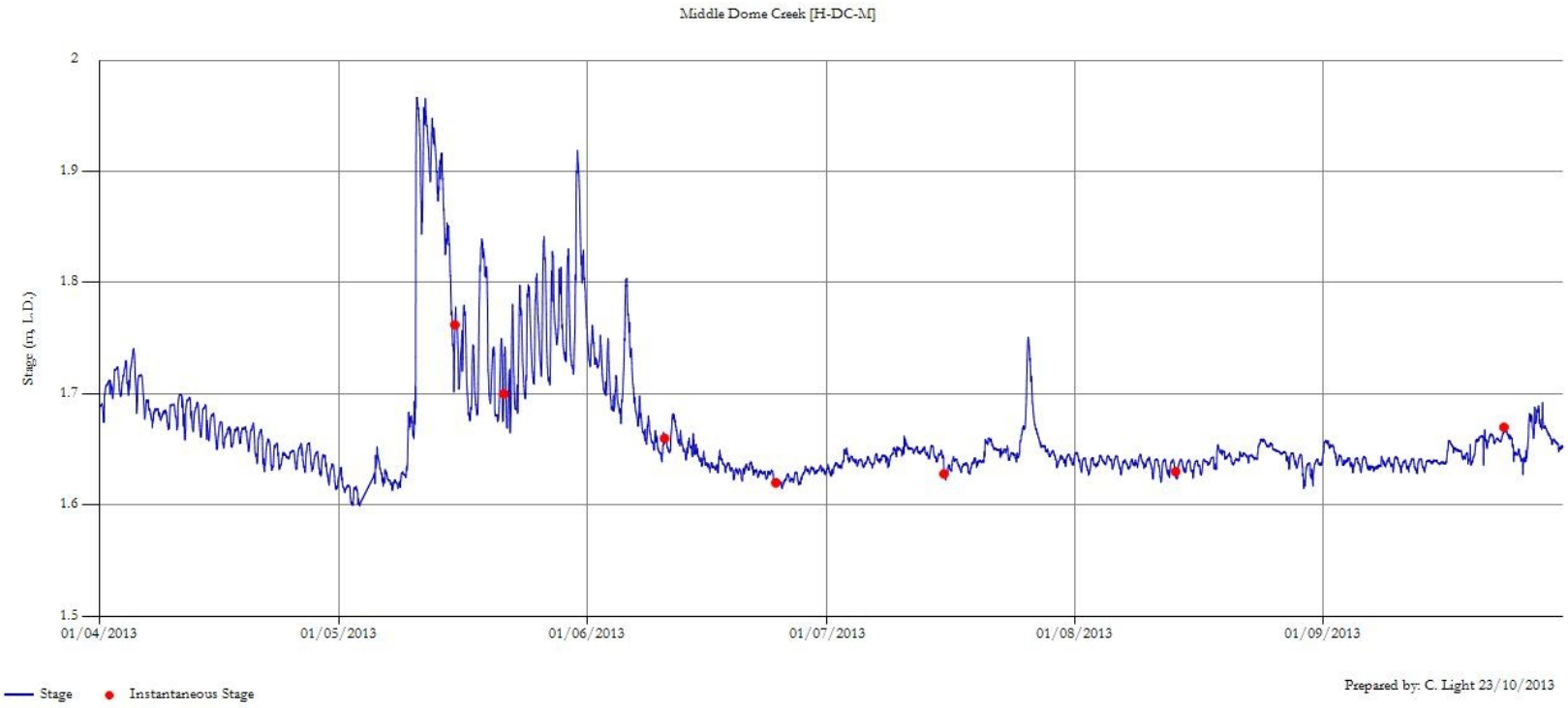

Figure D-9. H-DC-M stage.

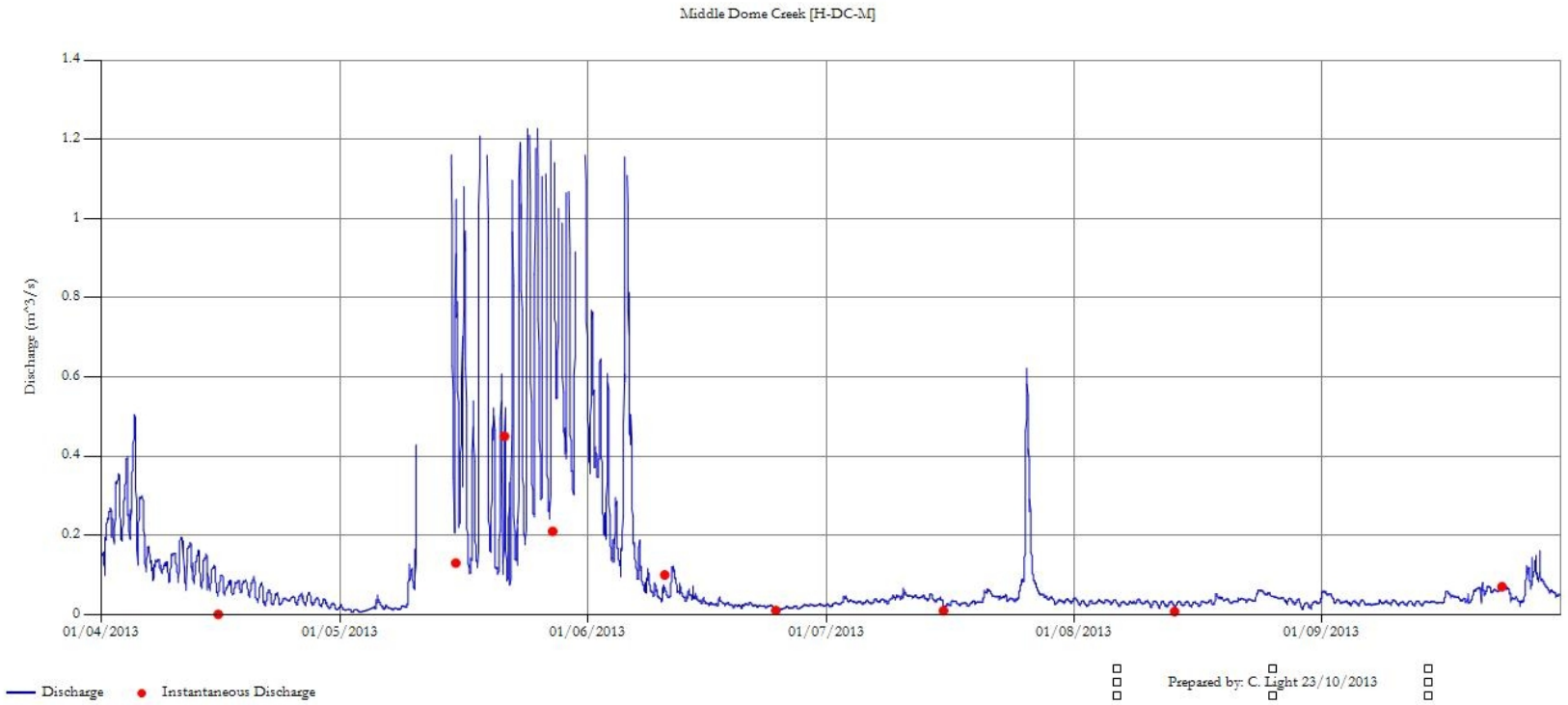

Figure D-10. H-DC-M hydrograph.

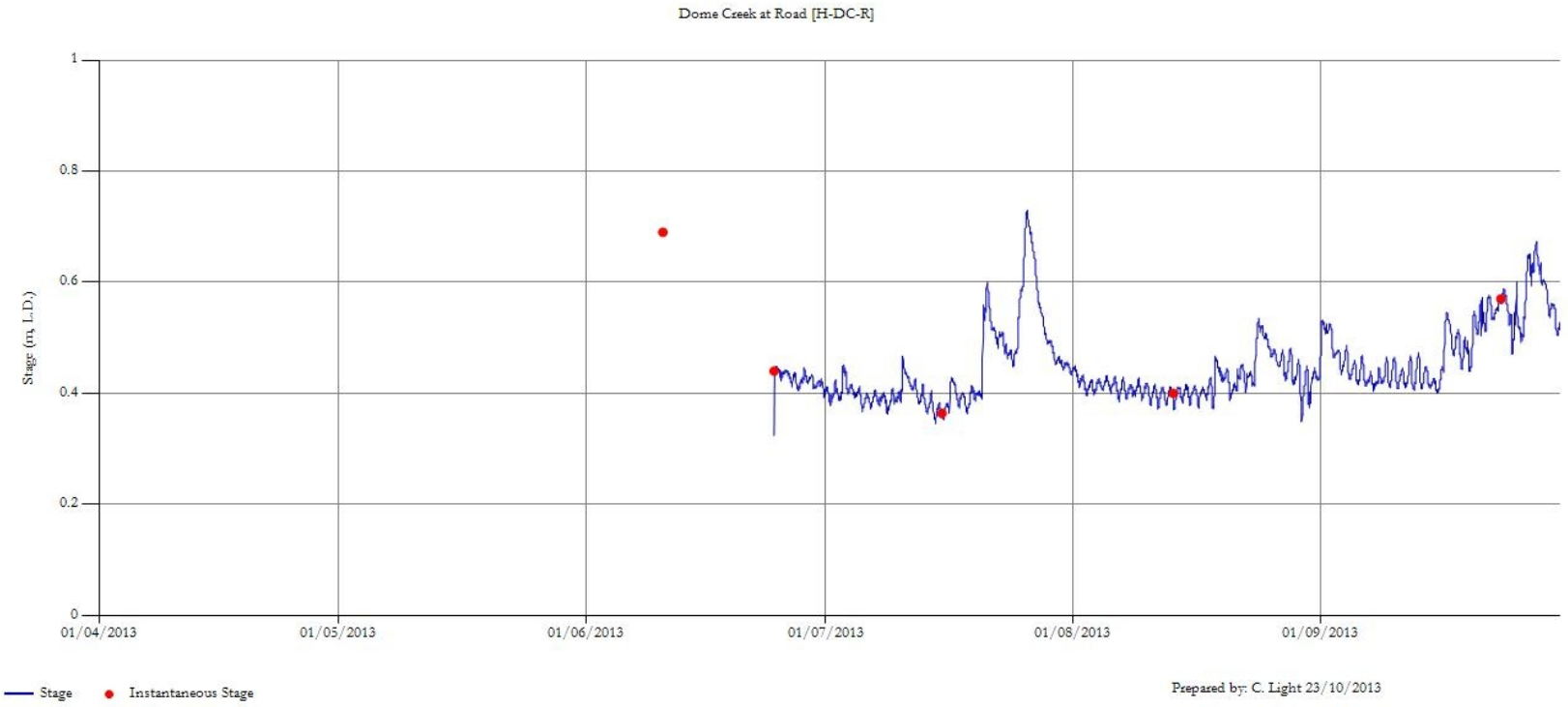

Figure D-11. H-DC-R stage.

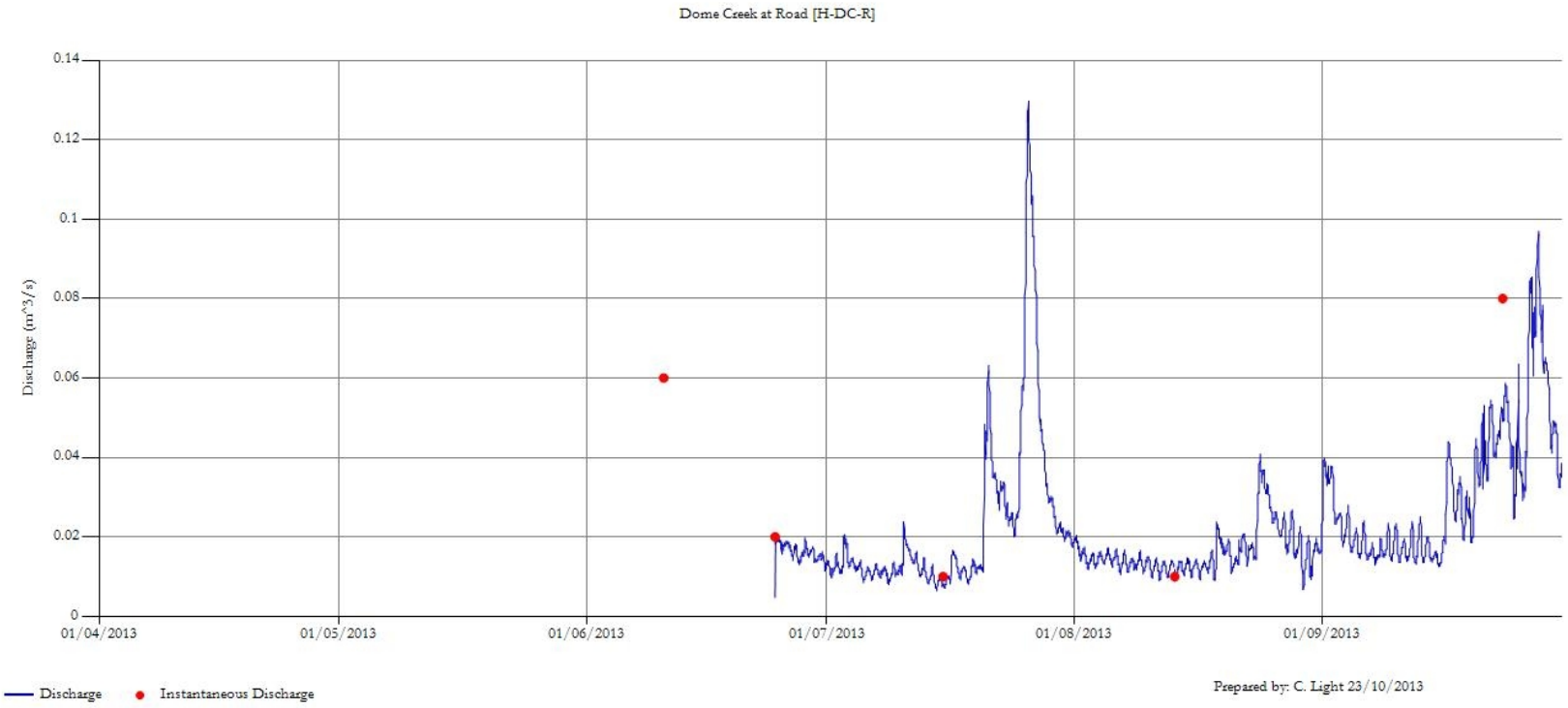

Figure D-12. H-DC-R hydrograph.

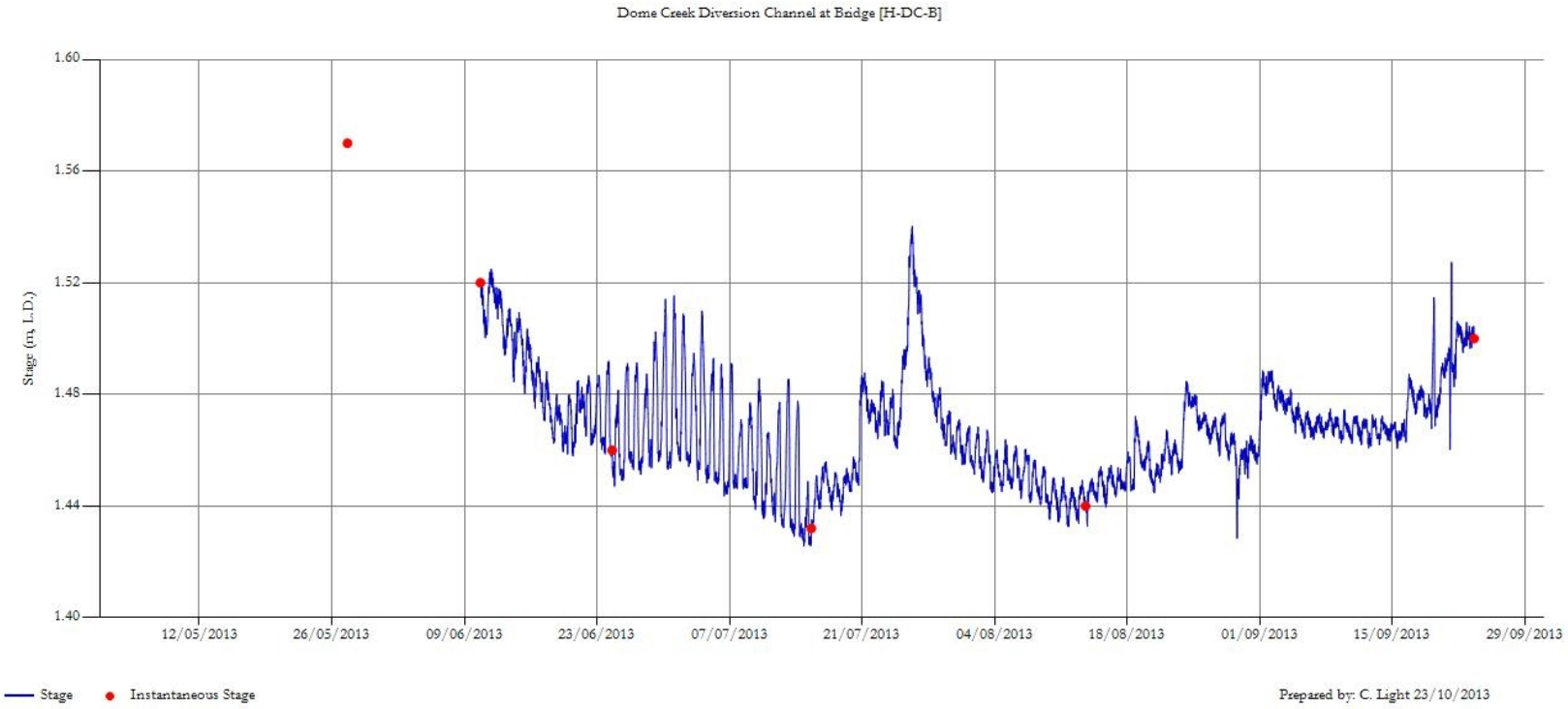

Figure D-13. H-DC-B stage.

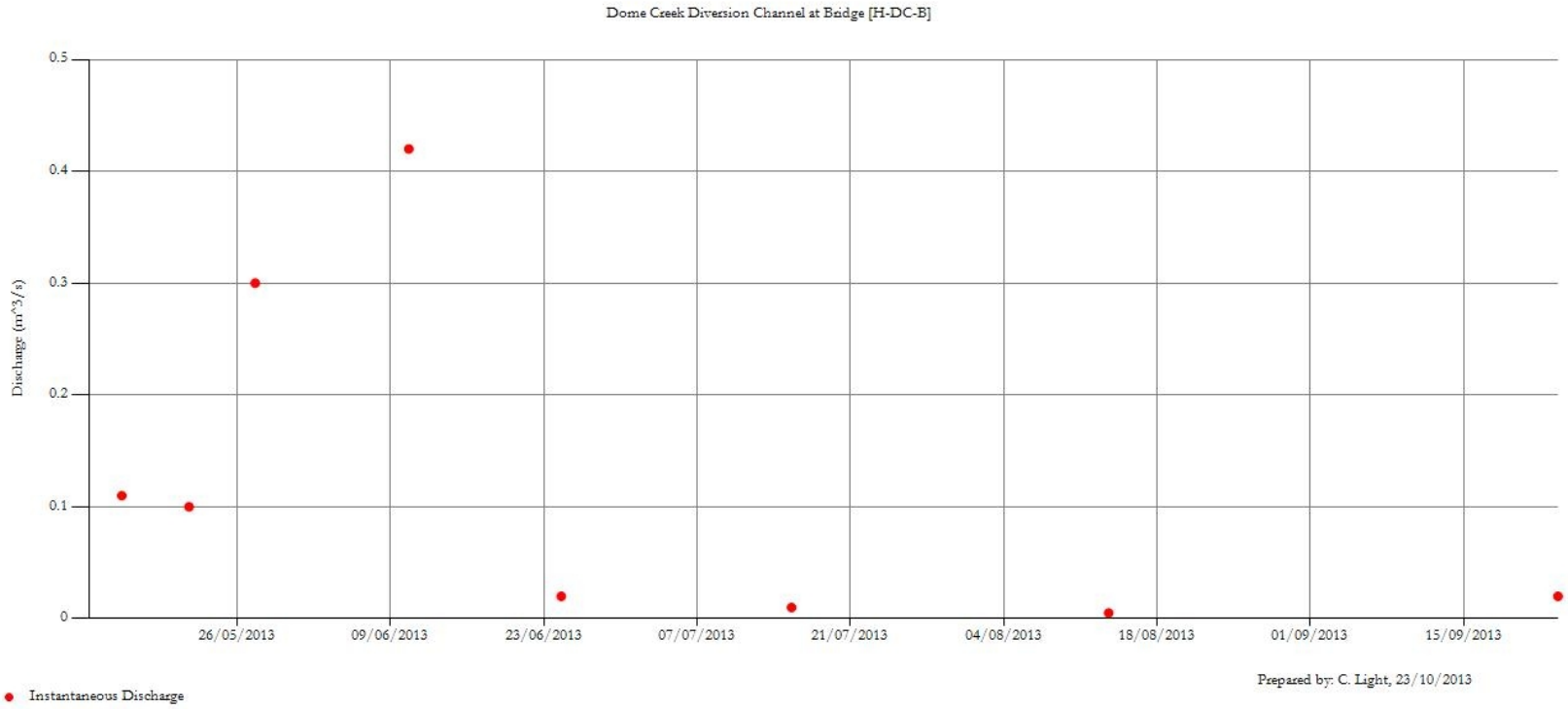

Figure D-14. H-DC-B instantaneous discharge.

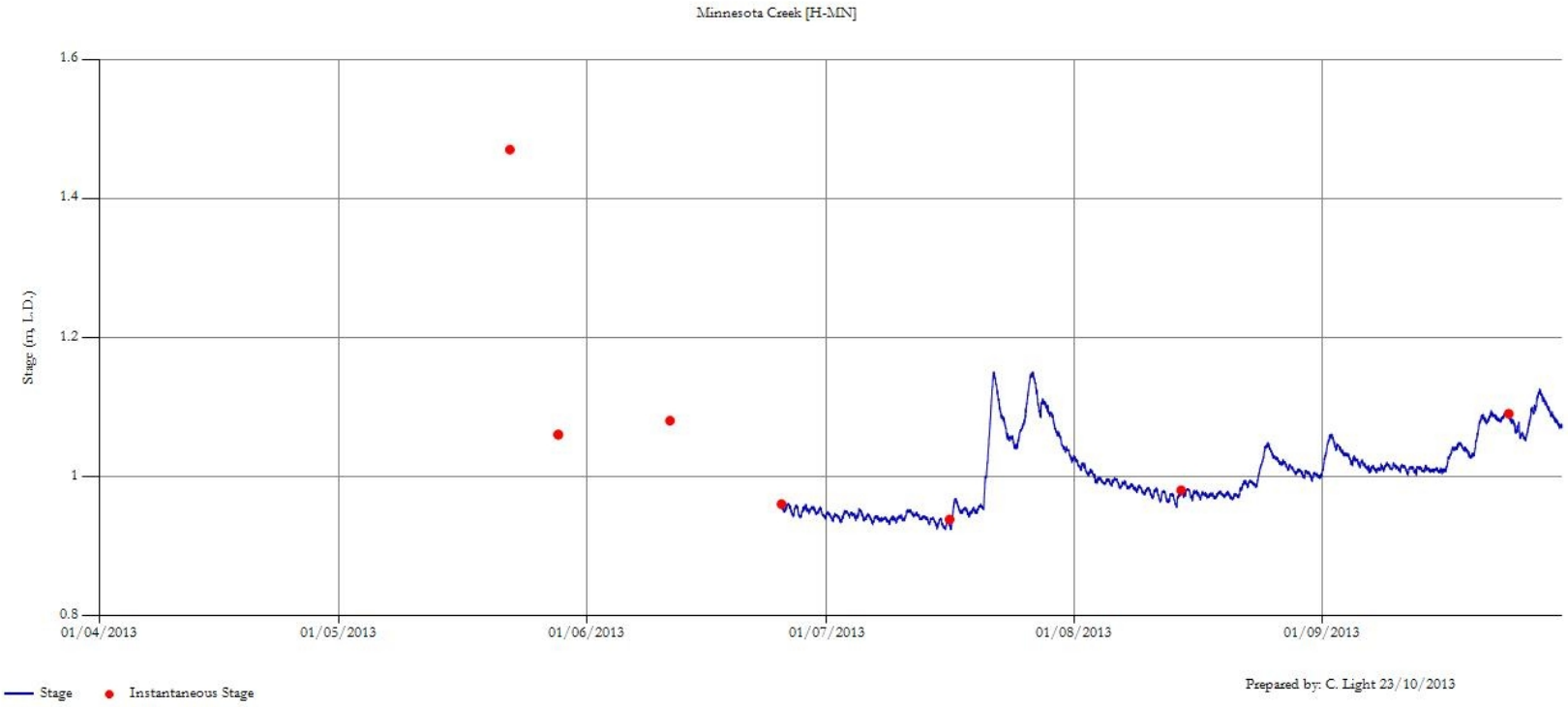

Figure D-15. H-MN stage.

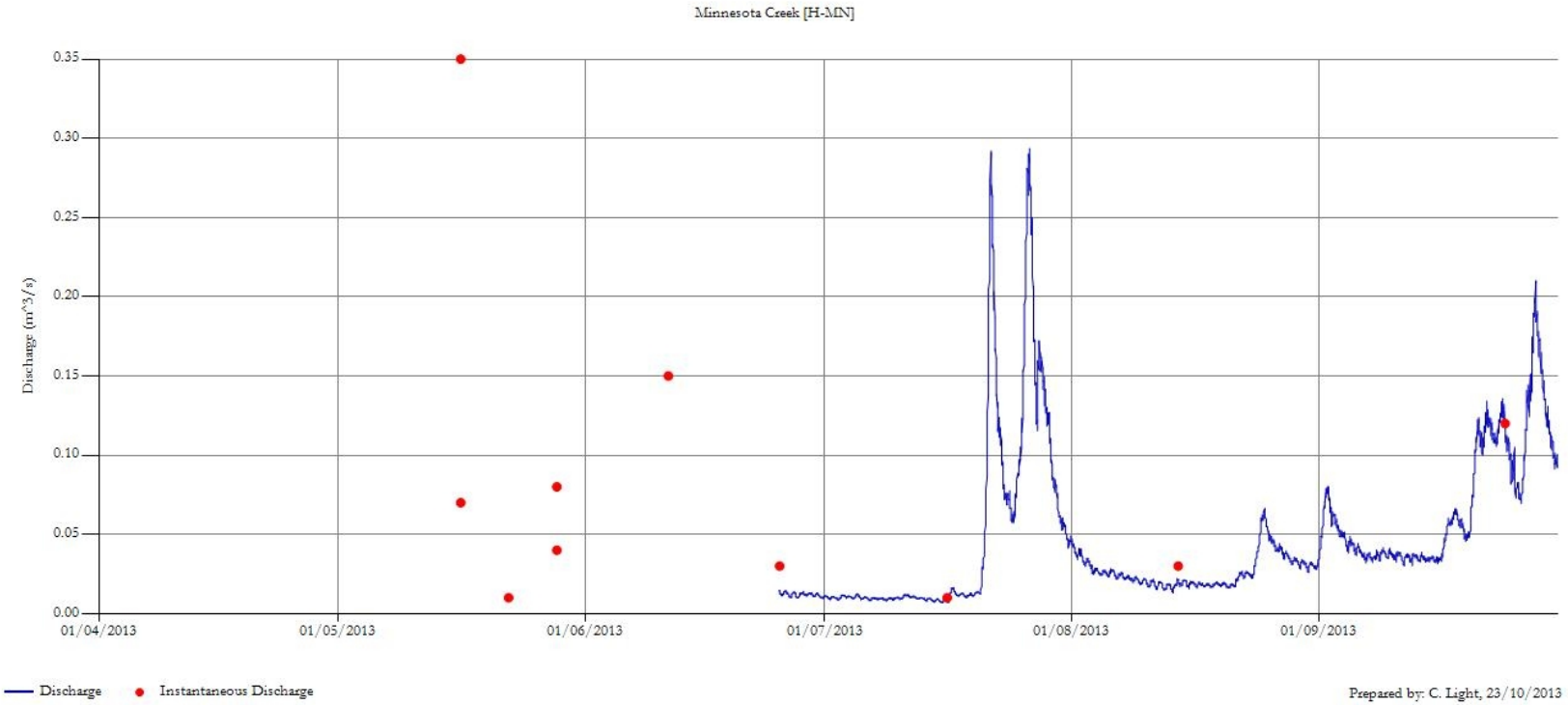

Figure D-16. H-MN hydrograph.

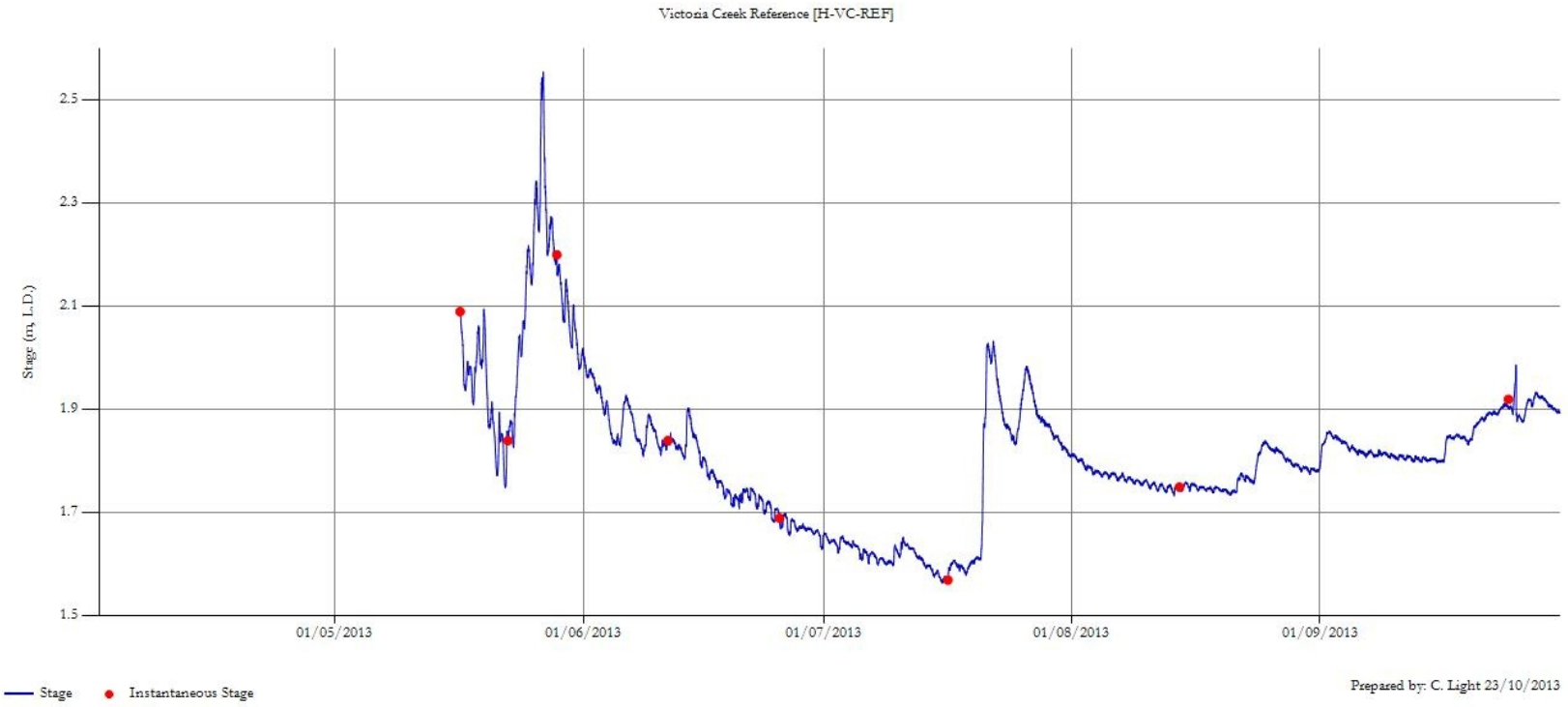

Figure D-17. H-VC-REF stage

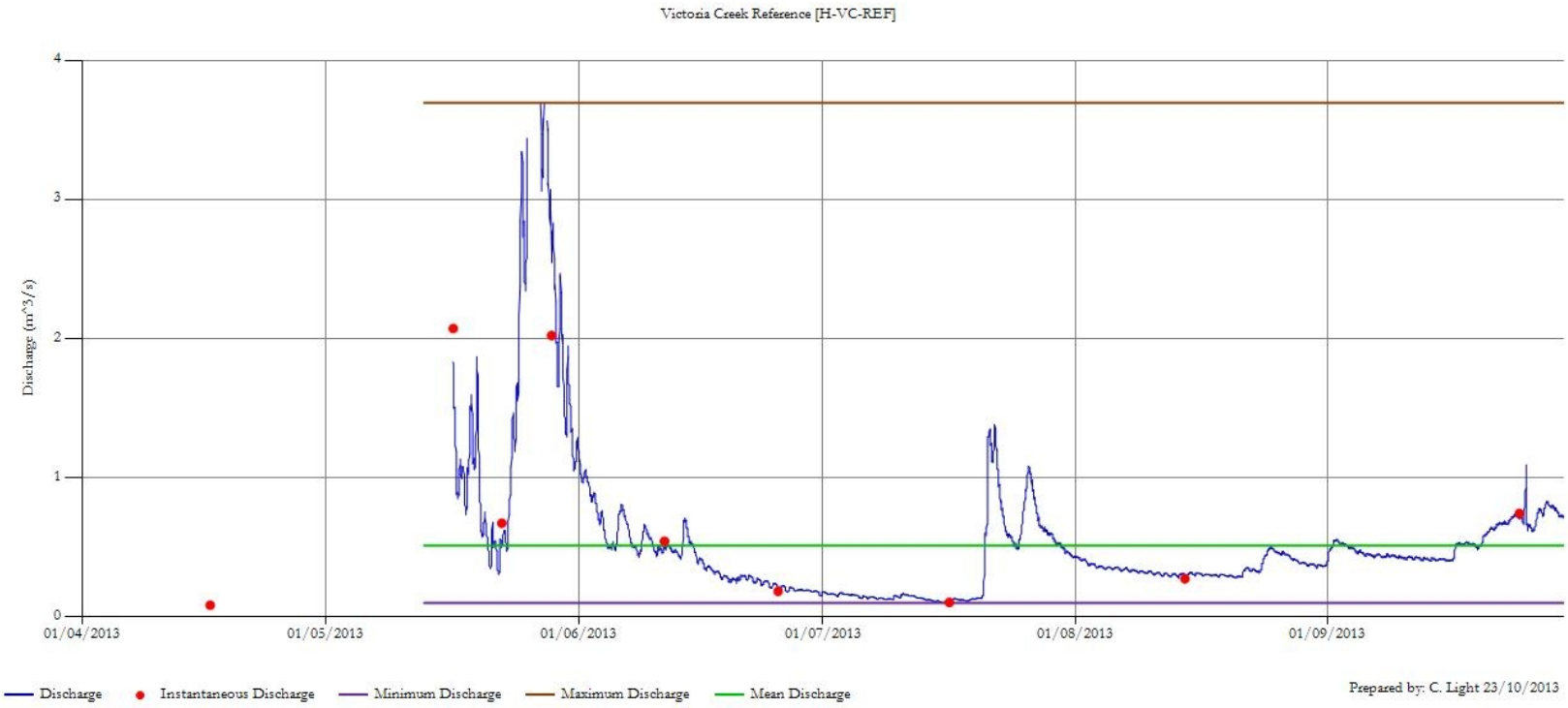

Figure D-18. H-VC-REF hydrograph.

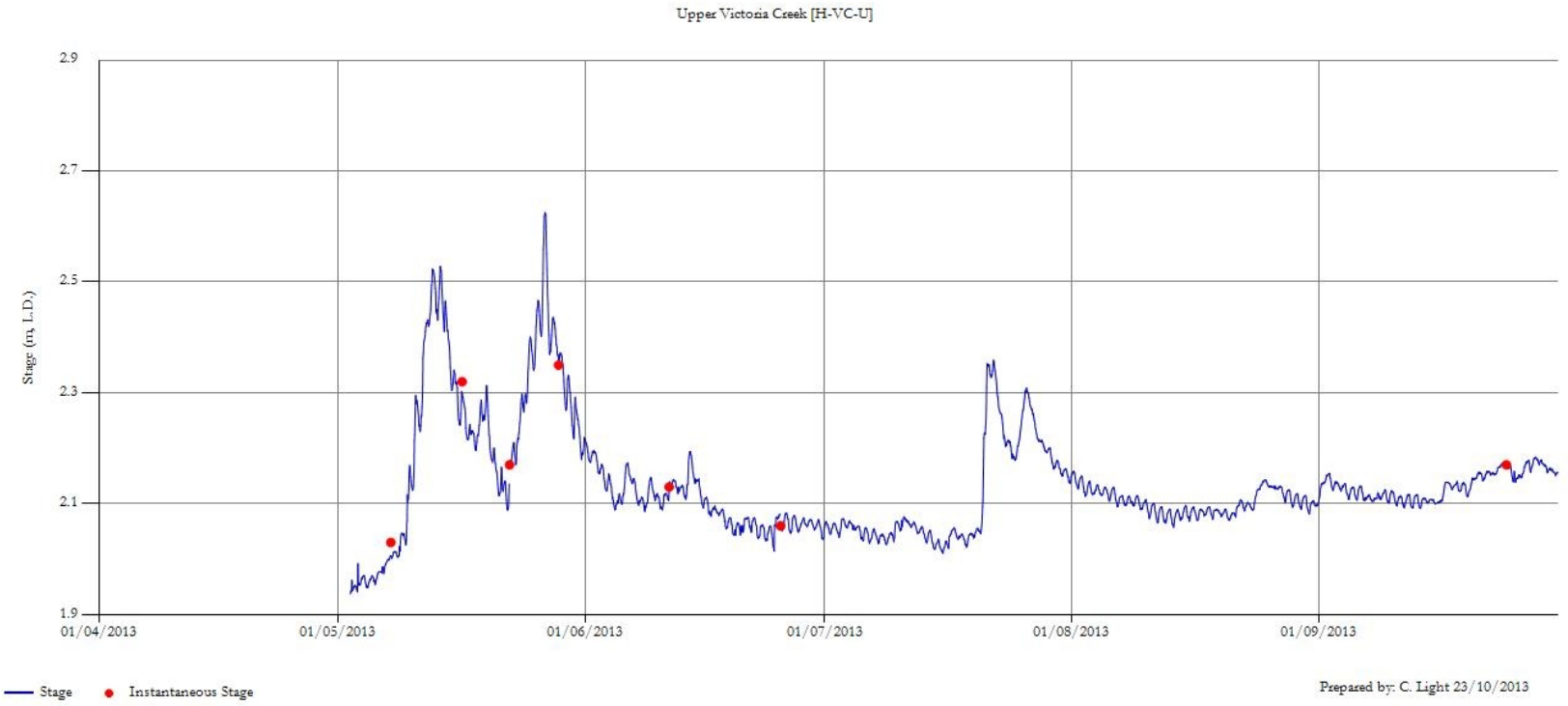

Figure D-19. H-VC-U stage.

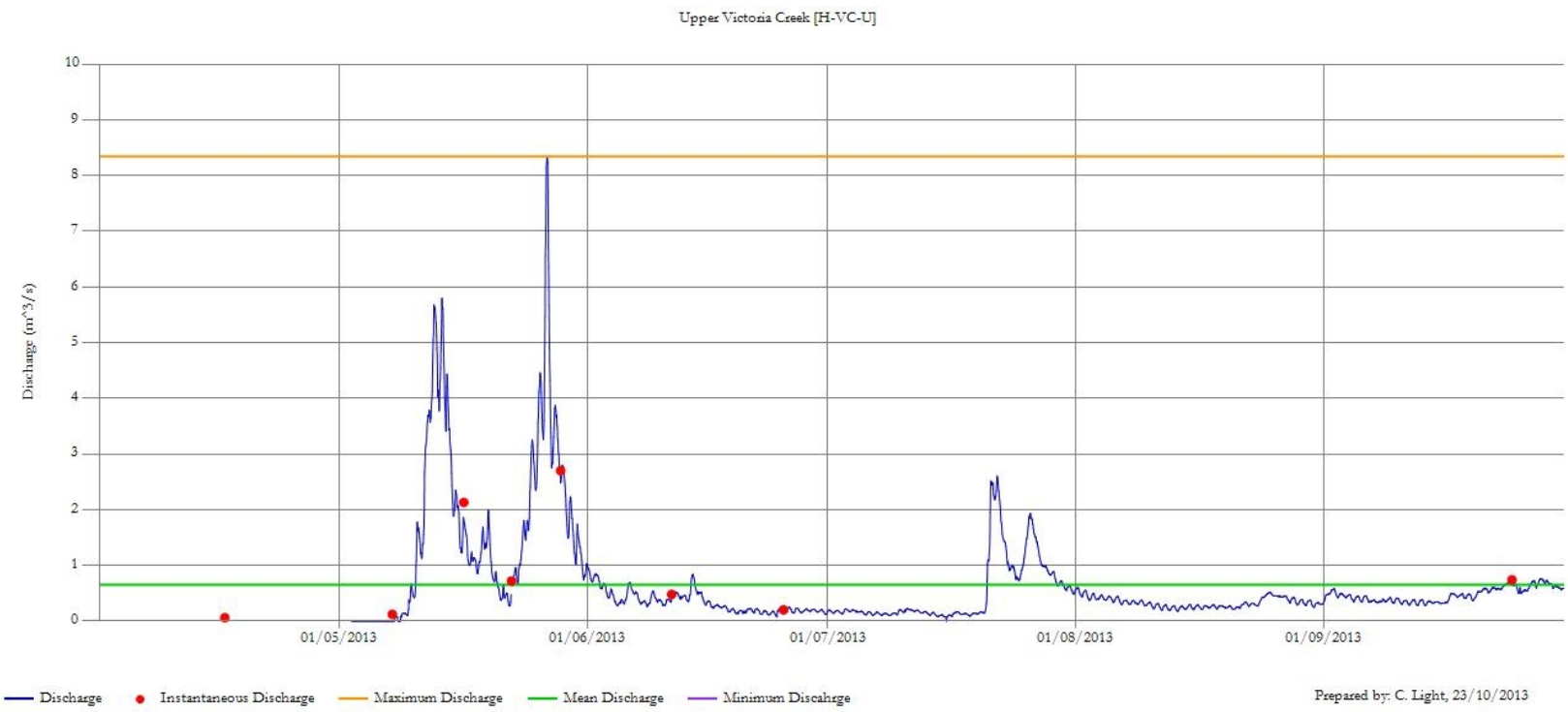

Figure D-20. H-VC-U hydrograph.

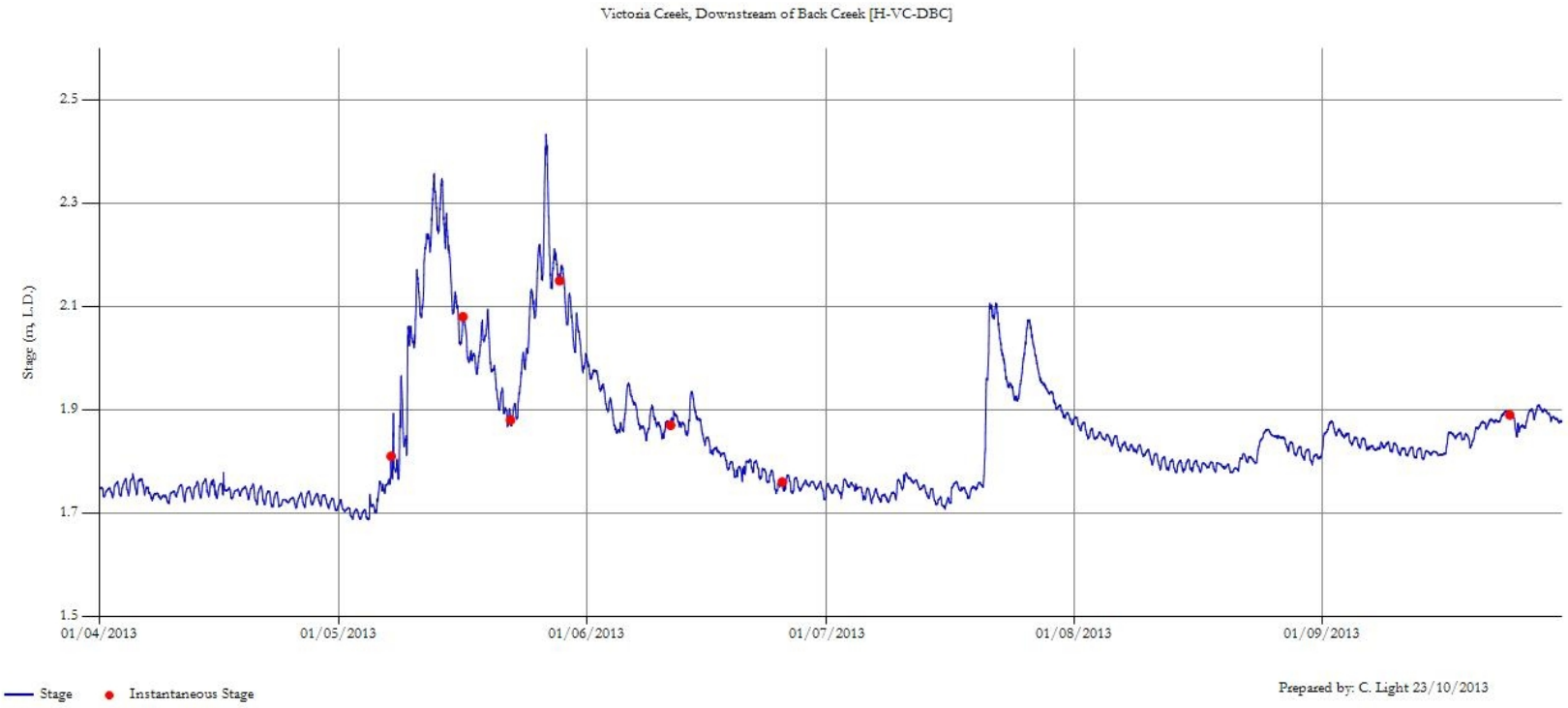

Figure D-21. H-VC-DBC stage.

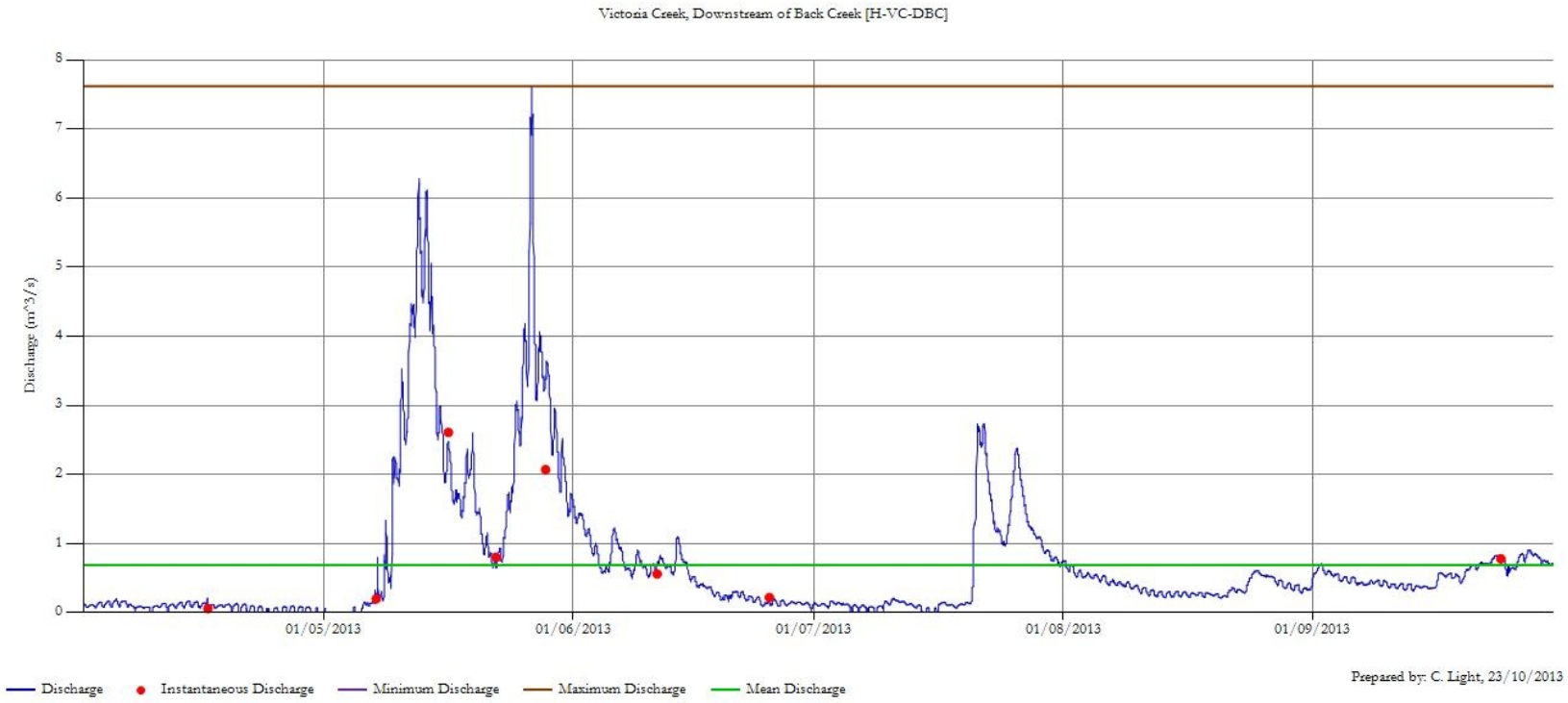

Figure D-22. H-VC-DBC hydrograph.

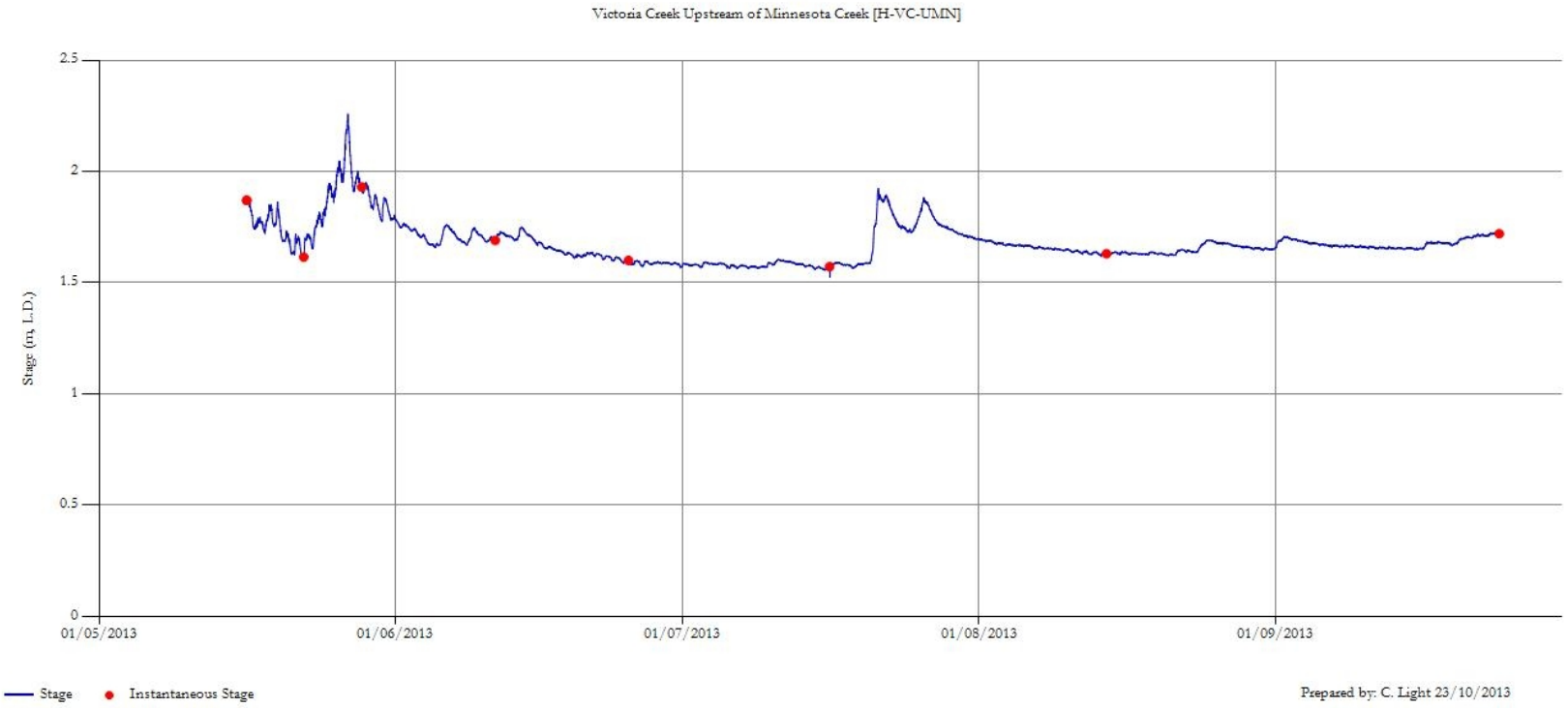

Figure D-23. H-VC-UMN stage.

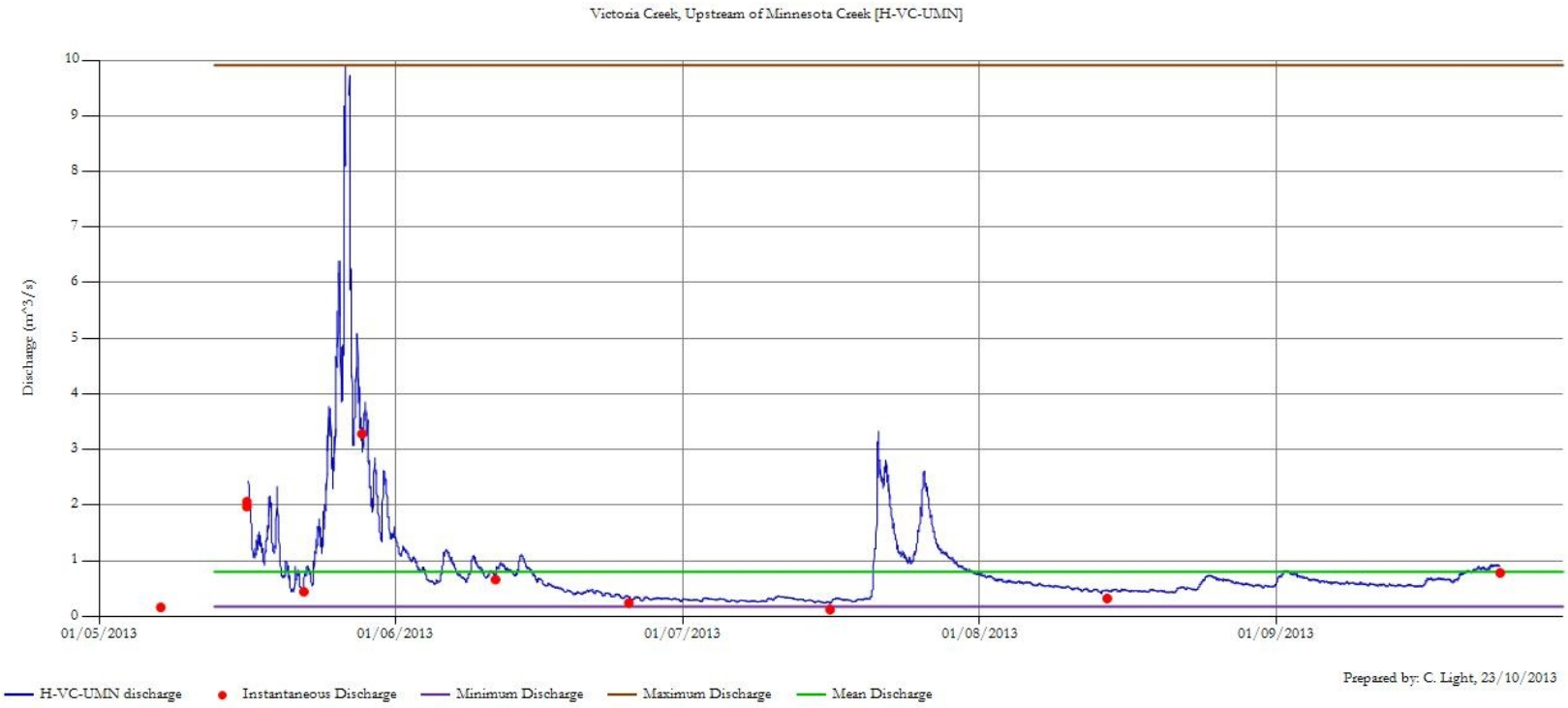

Figure D-24. H-VC-UMN hydrograph.

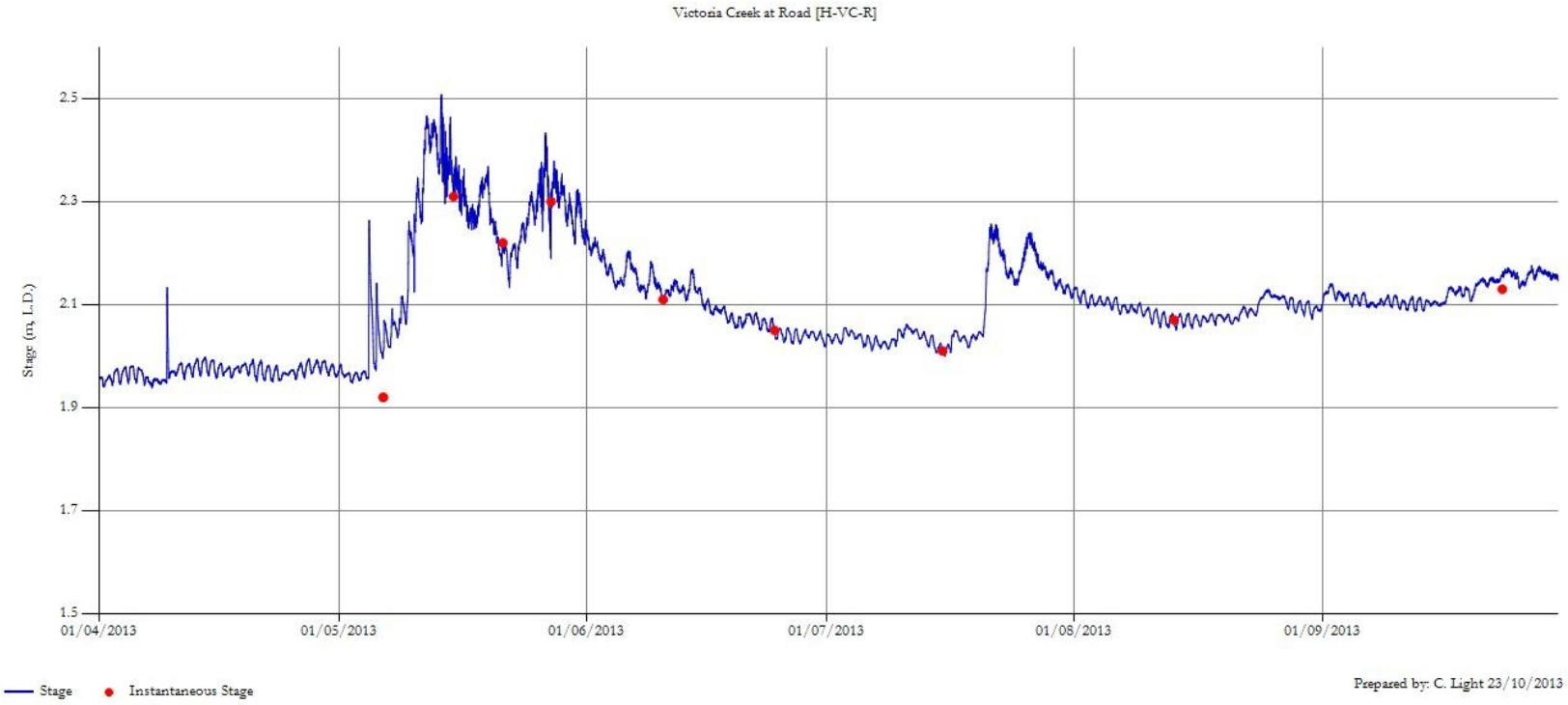

Figure D-25. H-VC-R stage.

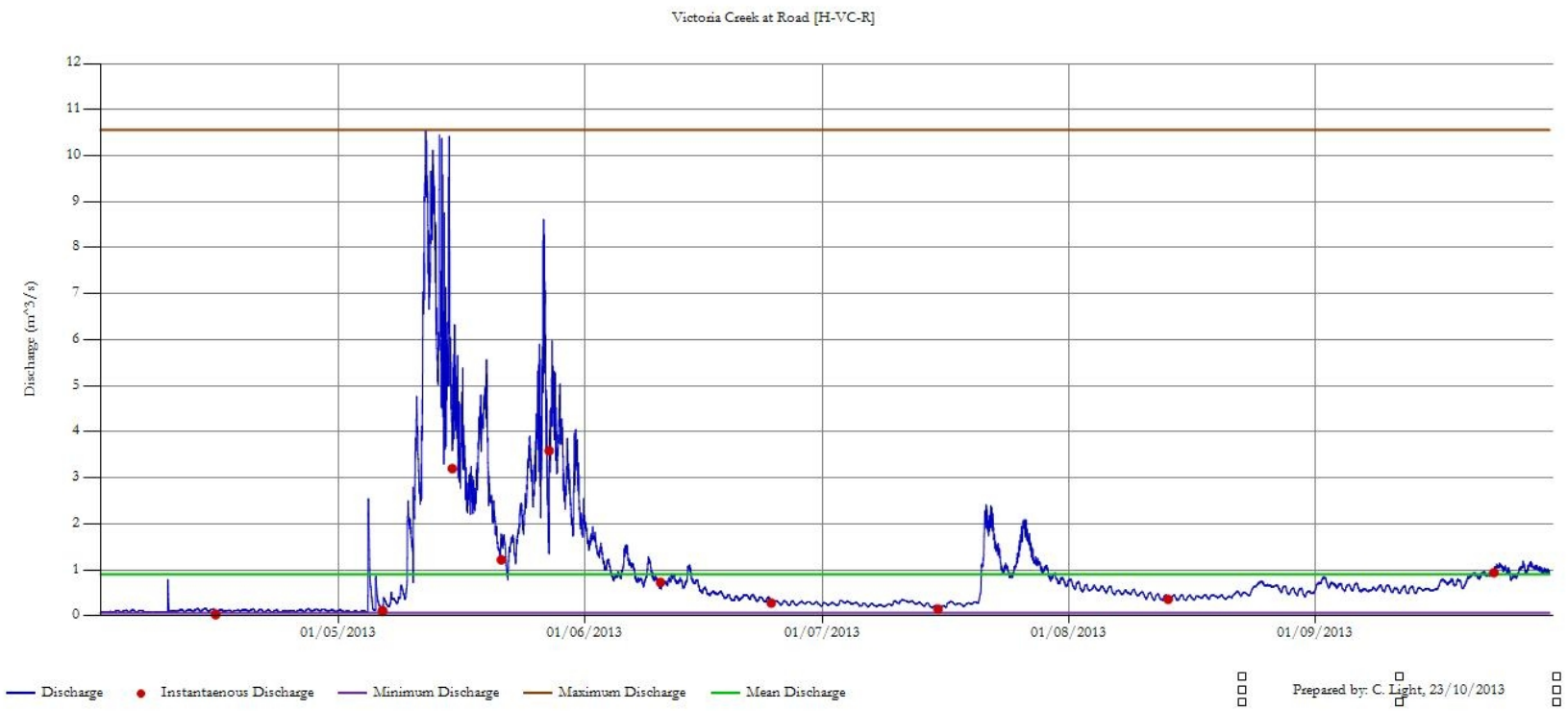

Figure D-26. H-VC-R hydrograph.

APPENDIX E Q2 SURFACE WATER QUALITY DATA

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Table E-1. Water Quality Results for in situ, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130717-025 WQ-PIT-2 17-JUL-13	0167-130717-024 WQ-PIT-1 17-JUL-13	0167-130717-023 WQ-PIT-3 17-JUL-13	0167-130717-030 WQ-PW 17-JUL-13	0167-130716-015 WQ-DC-U2 16-JUL-13	0167-130716-017 WQ-DC-U1 16-JUL-13	0167-130716-011 WQ-DC-DX+105 16-JUL-13	0167-130716-009 WQ-MS-S-03 16-JUL-13	0167-130716-014 WQ-PC-U 16-JUL-13	0167-130716-020 WQ-DC-U 16-JUL-13	0167-130716-018 WQ-DC-U-r 16-JUL-13	QA/QC WQ-DC-U-r	0167-130716-016 WQ-SEEP 16-JUL-13
Temperature (in-situ)	°C	-	-	-	12.8	13.0	11.0	2.6	6.4	6.9	0.8	5.6	7.1	14.2	-	-	9.4
Specific Conductivity (in-situ)	µS/cm	-	-	-	1552.0	1547.0	2462.0	426.1	1256.0	1227.0	1239.0	1256.0	468.5	1386.0	-	-	1672.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	8.0	8.0	7.0	7.4	7.7	7.5	7.0	7.3	6.5	8.0	-	-	6.9
Turbidity (in-situ)	NTU	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	n/a
Dissolved Oxygen (in-situ)	mg/L	-	-	-	8.4	8.3	7.6	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	<5.0	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1500	1460	2090	395	1120	1240	1180	1170	423	1310	1270	3%	1580
Hardness (as CaCO3)	mg/L	-	-	0.5	950	950	1450	196	759	814	726	752	224	847	795	6%	929
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.08	8.07	7.4	7.75	7.83	7.77	7.7	7.65	7.16	8.09	8.06	0%	7.38
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0	4	-	***288***	9.3	4	***55.3***	4.7	25.3	21.3	16%	22
Total Dissolved Solids	mg/L	-	-	10	1230	1230	1990	212	933	1000	879	903	281	1060	1030	3%	1300
Turbidity	NTU	-	-	0.1	0.36	0.28	1.19	<0.10	51.2	6.96	2.42	26.2	1.68	30.7	27.6	10%	87.8
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	128	128	191	-	224	198	263	259	73.6	225	219	3%	248
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	128	128	191	-	224	198	263	259	73.6	225	219	3%	248
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	<0.0050	<0.0050	-	0.0969	0.0306	0.0102	0.0066	0.0088	***0.926***	***0.955***	-3%	***3.9***
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	<10	<0.50	<5.0	<5.0	<5.0	<5.0	<0.50	<5.0	<5.0	-	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	***0.27***	***0.27***	<0.40	0.096	<0.20	<0.20	<0.20	<0.20	0.039	<0.20	<0.20	-	<0.20
Nitrate (as N)	mg/L	13	-	0.005	<0.050	<0.050	<0.10	0.143	0.068	<0.050	<0.050	<0.050	0.0075	0.33	0.341	-3%	1.38
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.010	<0.020	<0.0010	<0.010	<0.010	<0.010	<0.010	<0.0010	<0.010	<0.010	-	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	806	804	1350	36.1	532	599	459	476	151	604	605	0%	742
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	0.0114
Cyanide, Total	mg/L	-	0.3	0.005	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0134	0.0128	4%	0.0772
Cyanate	mg/L	-	-	0.2	-	-	-	-	0.56	0.35	<0.20	<0.20	<0.20	0.36	1.05	-192%	1.32
Thiocyanate (SCN)	mg/L	-	-	0.5	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	2.79
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0068***	***0.0088***	***0.0156***	<0.010	***5.38***	***0.0678***	***0.0132***	***0.561***	***0.0269***	***0.257***	***0.253***	2%	***0.0168***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0042	0.00413	0.00152	<0.00050	0.00426	0.00229	0.0154	0.0158	0.00038	0.00157	0.00163	-4%	0.00063
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0069***	***0.00705***	***0.0267***	0.00053	***0.0422***	***0.0146***	***0.0291***	***0.102***	***0.0058***	***0.0252***	***0.0253***	0%	***0.039***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0158	0.0158	0.0144	0.083	0.142	0.0438	0.0111	0.0409	0.0831	0.0761	0.0783	-3%	0.065
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	0.00019	<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	<0.0010	-	<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	<0.020	<0.10	0.039	0.041	<0.010	<0.010	<0.010	0.035	0.038	-9%	0.081
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00353***	***0.00358***	***0.00608***	<0.00020	***0.000499***	0.000019	***0.00687***	***0.00283***	***0.000075***	***0.000153***	***0.000149***	3%	***0.000546***
Calcium (Ca)-Total	mg/L	-	-	0.05	253	255	393	45.4	176	190	182	187	65.1	202	201	0%	273
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00011	<0.00010	<0.00020	<0.0020	***0.00959***	0.00032	0.00013	0.00084	0.00019	0.00072	0.00061	15%	0.00047
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	0.00365	0.00041	0.00052	0.00147	0.00147	0.00234	0.00245	-5%	0.00803
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00212***	***0.0023***	***0.0045***	<0.0010	***0.014***	0.00109	<0.00050	***0.007***	0.00079	***0.00224***	***0.00222***	1%	***0.00558***
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.025	0.02	0.071	<0.030	***10.2***	***1.32***	0.214	***3.95***	***1.39***	***4.12***	***3.77***	8%	***8.56***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000523	0.000507	***0.00153***	0.00057	***0.0072***	0.000054	0.000092	***0.0342***	0.000057	0.000402	0.000371	8%	0.000187
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00784	0.00748	0.0105	-	0.00903	0.00456	0.00816	0.00862	<0.00050	0.00189	0.00198	-5%	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	69	68.5	113	20.1	75.2	84.8	58.1	60.2	14.7	67.1	68	-1%	50.1
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0294	0.0296	0.397	<0.0020	***0.741***	0.359	***1.11***	***1.29***	***0.973***	***1.72***	***1.85***	-8%	***5.16***
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.00020	0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000187	0.000173	<0.00010	-	0.00063	0.000306	0.000351	0.000326	0.000109	0.000564	0.0006	-6%	0.000951
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00055	0.00051	0.0015	-	0.00711	0.00103	0.00217	0.00239	0.00087	0.00152	0.00149	2%	0.00256
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	0.439	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.06	3.04	4.43	0.91	4.29	3.96	3.53	4.05	0.28	3.87	4.22	-9%	6.5
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00020	<0.0010	0.00032	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.0001	17%	0.00018
Silicon (Si)-Total	mg/L	-	-	0.05	2.53	2.53	2.64	-	13.7	5.69	6.12	7.28	6.05	5.46	5.99	-10%	6.28
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000018	0.000013	<0.000020	-	0.000124	<0.000010	<0.000010	0.000549	<0.000010	0.000019	0.000016	16%	0.00003
Sodium (Na)-Total	mg/L	-	-	0.05	9.1	9.33	18.8	4.8	7.46	7.64	4.9	4.83	4.58	16.3	17.2	-6%	40.3
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.809	0.799	1.24	-	0.544	0.514	0.385	0.419	0.418	0.634	0.676	-7%	0.787
Sulfur (S)-Total	mg/L	-	-	0.5	267	266	429	-	173	209	147	155	53.4	185	203	-10%	235
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000082	0.000082	0.000098	-	0.000099	<0.000010	0.000111	0.000092	<0.000010	<0.000010	0.00001	10%	0.000013
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	0.00017	<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	<0.020	-	0.234	<0.010	<0.010	0.03	<0.010	0.012	0.011	8%	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00306	0.00292	0.00451	0.00202	0.00347	0.00223	0.0044	0.00369	0.000124	0.00274	0.00285	-4%	0.0028
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0020	-	0.0217	<0.0010	<0.0010	0.0027	<0.0010	0.0021	0.0021	0%	0.0015
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.36***	***0.364***	***0.733***	<0.050	***0.0919***	0.0116	***0.971***	***0.805***	0.0103	0.0109	0.0114	-5%	0.009
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0010	<0.0010	<0.0020	-	***0.0185***	***0.0114***	<0.0010	0.0011	***0.0131***	***0.0183***	***0.0167***	9%	***0.0063***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.0041	0.00398	0.00151	-	0.00321	0.0022	0.0153	0.0095	0.00032	0.00157	0.00144	8%	0.00055
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.00648***	***0.00639***	***0.0154***	-	***0.00525***	***0.0103***	***0.0102***	***0.0153***	0.00305	***0.0115***	***0.0113***	2%	***0.0225***

Table E-1. Water Quality Results for in situ, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130717-025 WQ-PIT-2 17-JUL-13	0167-130717-024 WQ-PIT-1 17-JUL-13	0167-130717-023 WQ-PIT-3 17-JUL-13	0167-130717-030 WQ-PW 17-JUL-13	0167-130716-015 WQ-DC-U2 16-JUL-13	0167-130716-017 WQ-DC-U1 16-JUL-13	0167-130716-011 WQ-DC-DX+105 16-JUL-13	0167-130716-009 WQ-MS-S-03 16-JUL-13	0167-130716-014 WQ-PC-U 16-JUL-13	0167-130716-020 WQ-DC-U 16-JUL-13	0167-130716-018 WQ-DC-U-r 16-JUL-13	QA/QC WQ-DC-U-r	0167-130716-016 WQ-SEEP 16-JUL-13
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0161	0.0159	0.0114	-	0.0603	0.0408	0.0115	0.0285	0.0729	0.0651	0.066	-1%	0.0639
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	<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	<0.0010	-	<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	<0.020	-	0.027	0.031	<0.010	<0.010	<0.010	0.035	0.033	6%	0.077
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00352***	***0.00349***	***0.00481***	-	0.000019	0.000015	***0.00569***	***0.00216***	***0.000071***	***0.000058***	***0.000058***	0%	***0.000396***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	265	265	395	-	179	188	190	198	65.7	220	204	7%	284
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00020	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00013	<0.00010	31%	0.00031
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	0.00043	0.00034	0.00051	0.00106	0.00077	0.00212	0.00209	1%	0.00798
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00172	0.0017	***0.00246***	-	0.00051	0.00061	<0.00020	0.0009	0.0005	0.00111	0.00113	-2%	***0.00308***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	<0.010	<0.010	<0.010	-	***0.428***	***0.691***	0.069	***0.563***	***0.482***	0.297	0.269	9%	***4.71***
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000195	0.000183	0.00021	-	<0.000050	<0.000050	<0.000050	0.000068	<0.000050	<0.000050	<0.000050	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00748	0.00733	0.0092	-	0.00445	0.00362	0.00806	0.00798	<0.00050	0.00272	0.00214	21%	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	70.1	69.8	112	-	76.2	83.4	60.9	62.7	14.7	72.4	69.5	4%	53.3
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0287	0.028	0.311	-	***0.577***	0.317	***1.1***	***1.23***	0.4	***1.75***	***1.67***	5%	***5.15***
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	0.000164	0.000164	<0.00010	-	0.000356	0.000266	0.000347	0.000284	0.000081	0.000587	0.0006	-2%	0.000908
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	<0.00050	<0.0010	-	0.00062	0.00082	0.0021	0.00173	0.00066	0.00103	0.00103	0%	0.00243
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	3.05	3.03	4.33	-	3.72	3.77	3.75	3.97	0.27	4.2	4.24	-1%	6.93
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00020	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	10%	0.0002
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.54	2.56	2.58	-	5.73	5.39	6.38	6.25	6.02	5.18	5.24	-1%	6.34
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000020	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	9.19	9.28	14.3	-	7.08	7	4.81	4.66	4.4	16.1	16.4	-2%	40.5
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.8	0.814	1.2	-	0.495	0.454	0.408	0.421	0.4	0.678	0.688	-1%	0.773
Sulfur (S)-Dissolved	mg/L	-	-	0.5	264	265	411	-	172	197	148	156	52.5	193	198	-3%	239
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.00008	0.000079	0.000096	-	<0.000010	<0.000010	0.0001	0.000054	<0.000010	<0.000010	<0.000010	-	0.000019
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00020	-	<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	<0.020	-	<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	0.00292	0.0029	0.00429	-	0.00265	0.002	0.00419	0.00349	0.000096	0.00282	0.00278	1%	0.00276
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0020	-	<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	***0.36***	***0.354***	***0.572***	-	0.0119	0.0072	***1.05***	***0.733***	0.0068	0.0015	0.0014	7%	0.0059

Table E-1. Water Quality Results for in situ, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130716-005 WQ-DC-R 16-JUL-13	0167-130716-012 WQ-BC 16-JUL-13	0167-130716-006 WQ-VC-U 16-JUL-13	0167-130716-021 WQ-TP 16-JUL-13	0167-130716-019 WQ-PC-D 16-JUL-13	0167-130716-010 WQ-DC-D1b 16-JUL-13	0167-130716-004 WQ-MN 16-JUL-13	0167-130716-002 WQ-MN-r 16-JUL-13	QA/QC WQ-MN-r	0167-130716-013 WQ-VC-REF 16-JUL-13	0167-130716-003 WQ-VC-UMN 16-JUL-13	0167-130716-001 WQ-VC-R 16-JUL-13	0167-130716-007 WQ-VC-DBC 16-JUL-13
Temperature (in-situ)	°C	-	-	-	9.1	14.8	7.5	17.5	6.9	7.0	5.3	-	-	10.6	8.0	7.5	7.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	1242.0	342.6	206.1	1254.0	592.8	1462.0	110.6	-	-	208.3	288.8	270.3	213.3
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.7	8.3	7.5	8.4	6.8	7.9	7.3	-	-	7.7	7.7	7.4	7.7
Turbidity (in-situ)	NTU	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	n/a	n/a	n/a	n/a
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1160	330	206	1160	547	1370	109	106	3%	202	277	261	208
Hardness (as CaCO3)	mg/L	-	-	0.5	699	174	102	695	304	948	54.2	54.2	0%	114	141	131	101
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.9	8.21	7.84	8.22	7.04	8.1	7.58	7.65	-1%	7.99	7.92	8.01	7.88
Total Suspended Solids	mg/L	-	50	3	15.3	<3.0	<3.0	6	6	***62***	3.3	<3.0	12%	<3.0	3.3	3.3	7.3
Total Dissolved Solids	mg/L	-	-	10	904	197	109	957	366	1130	60.5	59.7	1%	116	164	153	113
Turbidity	NTU	-	-	0.1	43.9	0.65	0.75	4.44	2.82	17.2	9.53	9.21	3%	1.07	1.88	2.41	1.62
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	196	111	89.8	80.7	156	263	53.1	51.8	2%	94.7	100	94.7	95.8
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<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	196	111	89.8	80.7	156	263	53.1	51.8	2%	94.7	100	94.7	95.8
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.715	<0.0050	<0.0050	0.0131	<0.0050	0.105	0.0358	0.0371	-4%	<0.0050	0.0173	0.0082	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<0.50	<5.0	<0.50	<5.0	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.075	0.058	<0.20	0.046	<0.20	0.074	0.074	0%	0.047	0.054	0.047	0.051
Nitrate (as N)	mg/L	13	-	0.005	0.467	<0.0050	0.045	0.099	0.0768	0.085	0.0322	0.0319	1%	0.049	0.0681	0.0583	0.044
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010	<0.010	<0.0010	<0.010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	519	63.3	16.8	632	156	641	3.44	3.46	-1%	16.2	50.6	45.5	17.5
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	0.0052	<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	1.02	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.16***	***0.026***	***0.0533***	***0.0625***	***0.236***	***0.937***	***0.0886***	***0.0936***	-6%	***0.0726***	***0.0345***	***0.039***	***0.0788***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00183	0.0002	0.00011	0.0451	0.0147	0.0194	0.00015	0.00013	13%	0.00011	0.00032	0.0003	0.00011
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0359***	0.00194	0.00037	***0.0906***	***0.0142***	***0.116***	0.0026	0.00264	-2%	0.00045	0.00227	0.00219	0.00045
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0709	0.0664	0.0717	0.00992	0.0349	0.0391	0.0899	0.0861	4%	0.0705	0.0689	0.0707	0.0716
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
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
Boron (B)-Total	mg/L	-	-	0.01	0.033	<0.010	<0.010	0.085	<0.010	0.051	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000147***	***0.00011***	0.000025	***0.00116***	***0.00435***	***0.00271***	***0.000038***	***0.000036***	5%	0.000024	0.000024	0.000028	0.000028
Calcium (Ca)-Total	mg/L	-	-	0.05	176	49.2	26	193	88.6	207	14.1	14.2	-1%	26.6	37	34.6	26.3
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00051	0.00018	0.00048	0.00016	0.00034	0.00178	0.00052	0.00061	-17%	0.0002	0.00017	0.00019	0.0002
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00219	0.00025	<0.00010	0.00084	0.00015	0.00074	0.00124	0.00128	-3%	<0.00010	0.00015	0.00022	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00147	0.0015	0.00133	***0.024***	***0.0257***	***0.00685***	***0.0027***	***0.00222***	18%	0.00131	0.00145	0.00163	0.00124
Iron (Fe)-Total	mg/L	0.3	1	0.01	***4.28***	0.095	0.089	0.3	***0.384***	***3.47***	***2.99***	***3.08***	-3%	0.109	0.179	***0.386***	0.101
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00306***	0.000077	0.000066	***0.00812***	***0.0114***	***0.0473***	0.000072	0.000064	11%	0.000093	0.000075	0.000069	0.000103
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00107	0.00093	<0.00050	0.00612	0.00067	0.00815	0.00052	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	58.1	11.7	8.84	44.3	19.9	88.6	4.44	4.53	-2%	9.24	11.9	11	8.84
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***1.77***	***0.607***	0.0411	0.479	0.248	***0.767***	0.384	0.395	-3%	0.0312	0.101	0.0978	0.0507
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000021	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.0005	0.000819	0.000481	0.00183	0.000089	0.000302	0.00038	0.000379	0%	0.000444	0.000432	0.000392	0.000424
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00138	0.00073	<0.00050	0.00138	0.0009	0.00175	0.00241	0.00247	-2%	<0.00050	0.00054	0.00061	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	0.06	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.59	0.91	0.7	11.2	1.17	4.03	0.88	0.9	-2%	0.67	0.95	0.92	0.7
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00011	8%	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	5.94	6.75	5.89	1.77	7.13	6.57	7.65	7.8	-2%	5.66	5.68	5.75	5.83
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000039	<0.000010	<0.000010	0.000194	0.000205	0.000585	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	0.000014
Sodium (Na)-Total	mg/L	-	-	0.05	15.7	3.65	2.48	15.2	4.7	6.34	2.14	2.23	-4%	2.49	3.7	3.59	2.55
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.579	0.314	0.281	0.486	0.579	0.517	0.0886	0.0886	0%	0.296	0.3	0.272	0.286
Sulfur (S)-Total	mg/L	-	-	0.5	172	21.9	6.04	207	54.4	198	1.45	1.45	0%	5.61	17.4	15.6	6.15
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	0.000261	0.00003	0.000083	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.010	0.046	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00232	0.00154	0.00061	0.000938	0.00093	0.00327	0.000331	0.000335	-1%	0.000694	0.000696	0.00065	0.000644
Vanadium (V)-Total	mg/L	-	-	0.001	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	0.0036	0.0015	0.0016	-7%	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0083	<0.0030	<0.0030	***0.0664***	***0.23***	***0.414***	0.0037	0.0037	0%	<0.0030	0.004	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0086***	***0.0068***	***0.0088***	***0.0093***	***0.0098***	0.0033	***0.0762***	***0.0813***	-7%	***0.0108***	***0.0083***	***0.0133***	***0.0089***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00118	0.00018	<0.00010	0.0449	0.0102	0.00971	0.00013	0.00012	8%	<0.00010	0.00032	0.00028	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0131***	0.0017	0.00035	***0.0612***	***0.00628***	***0.0137***	0.00231	0.00238	-3%	0.00033	0.0014	0.00157	0.00034

Table E-1. Water Quality Results for in situ, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130716-005 WQ-DC-R 16-JUL-13	0167-130716-012 WQ-BC 16-JUL-13	0167-130716-006 WQ-VC-U 16-JUL-13	0167-130716-021 WQ-TP 16-JUL-13	0167-130716-019 WQ-PC-D 16-JUL-13	0167-130716-010 WQ-DC-D1b 16-JUL-13	0167-130716-004 WQ-MN 16-JUL-13	0167-130716-002 WQ-MN-r 16-JUL-13	QA/QC WQ-MN-r	0167-130716-013 WQ-VC-REF 16-JUL-13	0167-130716-003 WQ-VC-UMN 16-JUL-13	0167-130716-001 WQ-VC-R 16-JUL-13	0167-130716-007 WQ-VC-DBC 16-JUL-13
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0643	0.0617	0.0689	0.00938	0.0325	0.0233	0.0881	0.0819	7%	0.0691	0.0723	0.0723	0.0693
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	0.029	<0.010	<0.010	0.081	<0.010	0.047	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000027	***0.000095***	0.000016	***0.000802***	***0.00459***	***0.000464***	0.000032	0.000033	-3%	0.000014	0.000019	0.000018	0.000018
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	182	50.2	26.2	202	88.9	222	14.3	14.3	0%	29.8	37	34.5	26.2
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00017	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.00053	0.00047	11%	<0.00010	0.00019	0.00013	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00204	0.00022	<0.00010	0.00078	<0.00010	0.00025	0.00121	0.00122	-1%	<0.00010	0.00013	0.00019	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00076	0.00124	0.00109	***0.017***	***0.0196***	0.00081	***0.00203***	0.00199	2%	0.00105	0.00118	0.00125	0.00108
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***0.854***	0.052	0.026	0.019	0.01	0.125	***2.44***	***2.57***	-5%	0.026	0.03	0.213	0.024
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	0.000307	0.000407	0.000108	<0.000050	0.000057	14%	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00083	<0.00050	<0.00050	0.0061	0.00085	0.00739	<0.00050	<0.00050	-	<0.00050	0.00059	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	59.6	11.9	8.84	46.2	20.1	95.3	4.5	4.52	0%	9.48	11.8	10.9	8.65
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***1.76***	***0.588***	0.0379	0.431	0.279	***0.659***	0.381	0.382	0%	0.0263	0.0936	0.0922	0.0477
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	0.00048	0.000752	0.000403	0.00186	0.00009	0.000253	0.000374	0.000372	1%	0.000426	0.000443	0.000394	0.000415
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00118	0.00061	<0.00050	0.00127	0.00108	0.00077	0.0025	0.00242	3%	<0.00050	<0.00050	0.00055	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	3.63	0.9	0.69	11.5	1.13	4.41	0.87	0.89	-2%	0.66	0.89	0.9	0.66
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	10%	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.52	6.84	5.81	1.71	6.75	5.51	7.75	7.79	-1%	5.69	5.57	5.64	5.66
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	0.000038	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	16	3.48	2.48	15.4	5.46	6.51	2.34	2.23	5%	2.45	3.68	3.57	2.51
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.575	0.296	0.291	0.496	0.602	0.521	0.0921	0.0894	3%	0.295	0.335	0.278	0.285
Sulfur (S)-Dissolved	mg/L	-	-	0.5	172	21.7	5.96	210	52.6	206	1.45	1.43	1%	5.61	17.3	15.5	6.1
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	0.000249	0.000016	0.000037	<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
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	0.0023	0.00147	0.000573	0.000911	0.00126	0.00334	0.000326	0.000333	-2%	0.000655	0.000737	0.000622	0.000638
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	0.0013	7%	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0016	<0.0010	0.0011	***0.0333***	***0.32***	***0.234***	0.0036	0.0036	0%	0.0014	0.0016	<0.0010	<0.0010

Table E-1. Water Quality Results for in situ, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130717-022 WQ-DC-DX 17-JUL-13	0167-130717-026 WQ-DRY 17-JUL-13	0167-130717-TRAVEL TRAVEL BLANK 17-JUL-13	0167-130717-FIELD-BLANK FIELD BLANK 17-JUL-13
Temperature (in-situ)	°C	-	-	-	3.8	2.2	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	873.0	377.4	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.1	7.4	-	-
Turbidity (in-situ)	NTU	-	-	-	n/a	n/a	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-
Conductivity	µS/cm	-	-	2	816	354	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	498	192	<0.50	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.25	7.91	***5.64***	***5.63***
Total Suspended Solids	mg/L	-	50	3	***314***	4	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	614	204	<1.0	<1.0
Turbidity	NTU	-	-	0.1	109	0.54	<0.10	<0.10
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	145	177	<1.0	1.1
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	145	177	<1.0	1.1
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0153	<0.0050	0.0386	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.067	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	<0.050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	333	24.9	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	-	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***1.87***	***0.0314***	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00149	0.00039	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0462***	0.00165	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0871	0.0843	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000114***	0.000017	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	130	52.4	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0028	0.00014	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00232	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00429***	0.0008	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	***9.03***	***0.439***	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00332***	0.000057	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	33.9	13.9	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***3.44***	0.00654	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	***0.000035***	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000182	0.000084	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00207	<0.00050	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	0.079	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	4.61	2.08	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	7.61	4.8	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000088	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	5.26	2.33	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.327	0.147	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	104	8.71	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000066	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.076	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000541	0.000358	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	0.007	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0152	<0.0030	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0048	0.0022	-	<0.0010
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00054	0.00035	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0166***	0.00048	-	<0.00010

Applied Guidelines: **- Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life**
- Mount Nansen Effluent Discharge Standards

Color Key:
- Exceeds CCME Guideline
- Exceeds MN Effluent Quality Standards (EQS)
- Exceeds both CCME and EQS
- 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, lab analysis, and QA/QC program; July 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130717-022 WQ-DC-DX 17-JUL-13	0167-130717-026 WQ-DRY 17-JUL-13	0167-130717-TRAVEL TRAVEL BLANK 17-JUL-13	0167-130717-FIELD-BLANK FIELD BLANK 17-JUL-13
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0641	0.0828	-	<0.000050
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000013	<0.000010	-	<0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	140	53.6	-	<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	0.00145	<0.00010	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00043	0.00058	-	<0.00020
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***4.17***	<0.010	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000107	<0.000050	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	36.1	14.1	-	<0.10
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***3.12***	0.00191	-	<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	0.000133	0.000074	-	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00064	<0.00050	-	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	4.82	2.13	-	<0.10
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.21	4.75	-	<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	5.54	2.33	-	<0.050
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.338	0.154	-	<0.00020
Sulfur (S)-Dissolved	mg/L	-	-	0.5	110	8.71	-	<0.50
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000441	0.00039	-	<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	0.0012	<0.0010	-	<0.0010

Table E-2. Water Quality Results for in situ, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-009 WQ-PC-D 8/14/2013	0167-130814-012 WQ-TP 8/14/2013	0167-130814-003 WQ-MS-S-08 8/14/2013	0167-130814-008 WQ-PC-U 8/14/2013	0167-130814-013 WQ-DC-U1 8/14/2013	0167-130814-005 WQ-MN 8/14/2013	0167-130814-011 WQ-SEEP 8/14/2013	0167-130814-010 WQ-SEEP-r 8/14/2013	QA/QC WQ-SEEP-r	0167-130814-021 WQ-DC-U 8/14/2013	0167-130814-015 WQ-DC-DX+105 8/14/2013	0167-130814-006 WQ-DC-R 8/14/2013	0167-130814-007 WQ-VC-R 8/14/2013	0167-130814-002 WQ-VC-UMN 8/14/2013
Temperature (in-situ)	°C	-	-	-	7.1	18.8	2.5	8.3	9.7	5.3	9.2	-	-	13.2	0.8	7.3	6.9	6.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	482.3	1309.0	1591.0	376.0	1262.0	85.2	1717.0	-	-	1361.0	1227.0	1168.0	221.4	238.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.25	8.53	7.42	7.40	7.86	7.89	7.39	-	-	8.06	7.06	7.73	7.97	7.88
Turbidity (in-situ)	NTU	-	-	-	0.95	4.38	4.12	4.57	2.03	15.40	54.70	-	-	22.80	3.11	49.30	4.13	3.21
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	454	1250	1470	368	1200	84.9	1520	1570	-3%	1310	1130	1130	192	238
Hardness (as CaCO3)	mg/L	-	-	0.5	245	709	951	188	745	43.1	874	909	-4%	758	678	620	107	116
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.11	8.15	7.59	7.89	7.82	7.45	7.68	7.58	1%	7.96	7.99	7.84	7.94	7.93
Total Suspended Solids	mg/L	-	50	3	<3.0	3.9	13.3	4.6	<3.0	<3.0	20.5	20.7	-1%	11	<3.0	8.5	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	358	1070	1350	276	1070	110	1410	1410	0%	1130	981	965	162	160
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	134	84.4	321	84.2	221	42.2	249	247	1%	222	283	202	84.7	87.5
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	<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	134	84.4	321	84.2	221	42.2	249	247	1%	222	283	202	84.7	87.5
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0056	0.0135	0.151	0.0072	0.0213	0.0289	***4.07***	***3.96***	3%	***1.26***	0.0207	***0.788***	0.0067	0.0169
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<5.0	<5.0	<0.50	<5.0	<0.50	<5.0	<5.0	-	<5.0	<5.0	<5.0	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.062	***0.26***	<0.20	0.056	<0.20	0.067	<0.20	<0.20	-	<0.20	***0.34***	***0.2***	0.057	0.056
Nitrate (as N)	mg/L	13	-	0.005	0.21	<0.050	0.127	<0.0050	<0.050	0.0301	1.19	1.14	4%	0.424	<0.050	0.602	0.0585	0.0687
Nitrite (as N)	mg/L	0.06	-	0.001	0.002	<0.010	<0.010	<0.0010	<0.010	0.001	0.035	0.028	20%	0.024	<0.010	0.035	0.0016	0.0017
Sulfate (SO4)	mg/L	-	-	0.5	125	671	673	107	558	2.27	753	753	0%	596	454	487	30.6	34.5
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0138	0.0095	31%	<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	0.065	0.0444	32%	0.0139	<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	<0.20	2.22	-	1.11	<0.20	0.29	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.14	3.14	0%	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.023***	***0.0179***	***0.0674***	***0.0244***	***0.0319***	***0.123***	***0.0185***	***0.0209***	-13%	***0.162***	0.0039	***0.101***	***0.0468***	***0.0415***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00754	0.0471	0.00401	0.00041	0.00244	0.00014	0.00059	0.00061	-3%	0.00125	0.0137	0.00109	0.00019	0.0002
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.00511***	***0.11***	***0.465***	0.0024	***0.0109***	0.00321	***0.0446***	***0.0463***	-4%	***0.024***	***0.0296***	***0.0411***	0.00228	0.00216
Barium (Ba)-Total	mg/L	-	1	0.00005	0.031	0.00905	0.0143	0.058	0.0388	0.0793	0.0739	0.0739	0%	0.0721	0.0118	0.0706	0.0684	0.0662
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	<0.010	0.094	0.01	<0.010	0.037	<0.010	0.08	0.083	-4%	0.042	<0.010	0.032	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00274***	***0.000731***	***0.00104***	0.000031	0.000013	***0.000038***	***0.00053***	***0.000551***	-4%	***0.000119***	***0.00539***	***0.000084***	0.000026	0.000026
Calcium (Ca)-Total	mg/L	-	-	0.05	71.8	208	219	55.3	171	12.1	261	272	-4%	190	174	159	27.8	30.2
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0002	0.00016	0.00022	0.00022	0.00021	0.00074	0.00052	0.00054	-4%	0.00049	0.00015	0.00052	0.00027	0.00027
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	0.00072	0.003	0.00013	0.00032	0.00125	0.00797	0.0083	-4%	0.00275	0.00052	0.00239	0.00024	0.00015
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0161***	***0.0195***	0.00124	0.00092	0.0009	***0.00242***	***0.00532***	***0.00564***	-6%	***0.00215***	<0.00050	0.00189	0.00179	0.00174
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.029	0.204	***5.32***	0.172	***0.793***	***3.45***	***8.68***	***8.55***	1%	***2.67***	0.269	***5.14***	***0.539***	0.227
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0011***	***0.00424***	***0.00633***	0.00005	<0.000050	0.000069	0.000092	0.000095	-3%	0.000174	0.000053	0.00061	0.000095	0.000089
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00137	0.00674	0.00753	0.00052	0.00423	0.00071	0.00052	0.00087	-67%	0.00239	0.00822	0.00142	0.00066	0.00073
Magnesium (Mg)-Total	mg/L	-	-	0.1	16.8	47.4	97	12.4	77.1	3.18	52.7	53.5	-2%	64.7	61.2	54.7	9.1	9.87
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0631	0.149	***2.94***	0.031	0.215	0.331	***5.44***	***5.83***	-7%	***2.24***	***1.15***	***2.04***	0.115	0.105
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	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00008	0.00198	0.000258	0.000067	0.000324	0.000303	0.00104	0.00107	-3%	0.000624	0.000401	0.000578	0.000419	0.000431
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00083	0.00092	0.00143	<0.00050	0.00086	0.00267	0.00281	0.00289	-3%	0.00151	0.00194	0.00143	0.00068	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.96	12.8	4.86	0.35	3.43	0.75	6.76	6.78	0%	4.19	3.63	3.45	0.74	0.73
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00014	0.00021	0.00021	0%	0.00012	<0.00010	0.00011	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.42	1.7	6.15	6.63	5.62	7.86	6.15	6.42	-4%	5.93	6.17	6.16	6.06	5.79
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000036	0.000127	0.00013	<0.000010	<0.000010	<0.000010	0.000034	0.000037	-9%	0.000013	<0.000010	0.000014	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	4.21	17.2	7.54	4.21	6.71	1.99	39.9	40.8	-2%	18.7	5.11	16.8	3.05	3.12
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.483	0.568	0.541	0.41	0.476	0.0697	0.822	0.831	-1%	0.663	0.45	0.57	0.275	0.292
Sulfur (S)-Total	mg/L	-	-	0.5	41.8	220	217	36.4	179	1.09	248	247	0%	194	150	160	10.6	11.8
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000012	0.000289	0.00009	<0.000010	<0.000010	<0.000010	0.000014	0.000015	-7%	<0.000010	0.000112	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<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	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000898	0.00103	0.00419	0.0003	0.00203	0.000174	0.00321	0.00332	-3%	0.00244	0.00479	0.00199	0.000541	0.000585
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	0.0015	0.0016	-7%	0.0014	<0.0010	0.0016	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.224***	***0.0377***	***0.0974***	0.0036	0.007	0.0037	0.0072	0.0077	-7%	0.0062	***0.856***	0.0069	<0.0030	<0.0030
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	***0.0124***	***0.0056***	<0.0010	***0.0117***	***0.0163***	***0.0914***	***0.008***	***0.0085***	-6%	***0.0179***	<0.0010	***0.0118***	***0.0207***	***0.0134***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00769	0.0462	0.00294	0.0004	0.00243	0.00013	0.00055	0.00055	0%	0.00121	0.0136	0.00092	0.00018	0.00018
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00487	***0.086***	***0.372***	0.00207	***0.00956***	0.00252	***0.0241***	***0.0244***	-1%	***0.015***	***0.00858***	***0.0145***	0.00136	0.00122
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0306	0.0084	0.0127	0.0557	0.038	0.075	0.07	0.0697	0%	0.0673	0.0114	0.0614	0.066	0.0648

Table E-2. Water Quality Results for in situ, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-009 WQ-PC-D 8/14/2013	0167-130814-012 WQ-TP 8/14/2013	0167-130814-003 WQ-MS-S-08 8/14/2013	0167-130814-008 WQ-PC-U 8/14/2013	0167-130814-013 WQ-DC-U1 8/14/2013	0167-130814-005 WQ-MN 8/14/2013	0167-130814-011 WQ-SEEP 8/14/2013	0167-130814-010 WQ-SEEP-r 8/14/2013	QA/QC WQ-SEEP-r	0167-130814-021 WQ-DC-U 8/14/2013	0167-130814-015 WQ-DC-DX+105 8/14/2013	0167-130814-006 WQ-DC-R 8/14/2013	0167-130814-007 WQ-VC-R 8/14/2013	0167-130814-002 WQ-VC-UMN 8/14/2013
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	<0.010	0.086	<0.010	<0.010	0.032	<0.010	0.074	0.075	-1%	0.037	<0.010	0.029	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00269***	***0.000451***	***0.000148***	0.000028	0.000011	0.000029	***0.000387***	***0.000401***	-4%	***0.000069***	***0.00373***	0.000032	0.000021	0.000021
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	71.2	205	220	55	169	12	262	275	-5%	194	170	158	27.9	30.1
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.0001	<0.00010	<0.00010	0.00012	0.00012	0.00058	0.00035	0.00034	3%	0.00015	<0.00010	0.00021	0.00015	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00066	0.0028	0.00013	0.00029	0.00115	0.008	0.00789	1%	0.00261	0.0005	0.00219	0.00022	0.00012
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.0157***	***0.0142***	<0.00020	0.00078	0.00071	***0.00211***	***0.00293***	***0.003***	-2%	0.00113	<0.00020	0.00084	0.00136	0.00123
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.01	0.018	***4.31***	0.096	***0.556***	***2.24***	***4.65***	***4.6***	1%	***0.497***	0.101	***0.949***	0.291	0.064
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000726	0.000295	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00136	0.00675	0.00805	<0.00050	0.00412	0.00091	0.00051	0.00088	-73%	0.00226	0.00825	0.00145	0.00069	0.00081
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	16.3	47.5	97.6	12.2	78.2	3.18	53.6	53.8	0%	66.3	61.4	55	9.06	9.86
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0628	0.0843	***2.87***	0.0308	0.205	0.315	***5.5***	***5.54***	-1%	***2.1***	***1.13***	***1.91***	0.105	0.0986
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	0.000073	0.00193	0.000241	0.000072	0.000319	0.000292	0.000991	0.00096	3%	0.000619	0.000371	0.000515	0.000391	0.000414
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00078	0.00079	0.00138	<0.00050	0.00077	0.00252	0.00271	0.00248	8%	0.00123	0.00194	0.00117	0.00061	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.95	12.3	4.73	0.34	3.41	0.74	6.86	6.98	-2%	4.2	3.47	3.35	0.72	0.75
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00011	0.00022	0.0002	9%	0.00012	<0.00010	0.00011	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.39	1.64	5.91	6.48	5.61	7.85	6.11	6.31	-3%	5.67	6.06	5.69	6.04	5.85
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	0.000014	0.000033	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.2	16.6	7.19	4.14	6.54	2	39.7	40	-1%	18.6	4.95	16.2	2.91	3.07
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.466	0.55	0.515	0.388	0.467	0.067	0.819	0.805	2%	0.659	0.44	0.548	0.264	0.288
Sulfur (S)-Dissolved	mg/L	-	-	0.5	40.8	214	210	35	176	1.07	243	238	2%	193	145	157	10.5	11.6
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000011	0.000284	0.000065	<0.000010	<0.000010	<0.000010	0.000013	0.000013	0%	<0.000010	0.000104	<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	0.000855	0.000995	0.00398	0.000295	0.00199	0.000162	0.00316	0.00318	-1%	0.00243	0.00468	0.00193	0.000501	0.00057
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<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	***0.23***	0.0161	***0.0909***	0.0024	0.0062	0.0027	0.0063	0.007	-11%	0.0025	***0.843***	0.0018	<0.0010	0.0011

Table E-2. Water Quality Results for in situ, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130814-023 WQ-VC-DBC 8/14/2013	0167-130814-027 WQ-PIT-1 8/14/2013	0167-130814-028 WQ-PIT-2 8/14/2013	0167-130814-029 WQ-PIT-3 8/14/2013	0167-130814-030 WQ-PW 8/15/2013	0167-130814-026 WQ-VC-REF 8/14/2013	0167-130814-024 WQ-VC-U 8/14/2013	0167-130814-025 WQ-BC 8/14/2013	0167-130814-019 WQ-DC-DX 8/14/2013	0167-130814-014 WQ-DC-U2 8/14/2013	0167-130814-016 WQ-MS-S-03-r 8/14/2013	0167-130814-017 WQ-MS-S-03 8/14/2013	QA/QC WQ-MS-S-03-r	0167-130814-022 WQ-DC-D1b 8/14/2013
Temperature (in-situ)	°C	-	-	-	6.0	15.3	14.0	14.7	1.4	7.3	6.0	9.3	5.3	8.6	-	2.9	-	10.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	194.2	1610.0	1606.0	1295.0	370.9	185.3	187.6	336.8	476.1	1181.0	-	1264.0	-	1433.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.77	8.13	7.20	8.02	7.90	7.30	7.74	8.31	7.55	7.77	-	7.04	-	8.10
Turbidity (in-situ)	NTU	-	-	-	1.78	2.79	0.79	1.23	0.33	1.59	1.68	1.41	39.30	60.30	-	5.62	-	8.01
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	<5.0	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	199	1490	1770	1550	366	192	187	330	460	1130	1150	1160	-1%	1380
Hardness (as CaCO3)	mg/L	-	-	0.5	95	966	990	1300	189	91.3	92.7	169	241	692	727	716	2%	883
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.81	8.05	7.65	8.05	7.74	7.92	7.78	8.12	7.41	7.74	8.06	7.48	7%	8.04
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0	3.7	<3.0	-	<3.0	<3.0	<3.0	25.3	***235***	4.8	<3.0	40%	12.3
Total Dissolved Solids	mg/L	-	-	10	125	1430	1700	1420	204	132	133	221	348	959	1020	1020	0%	1260
Turbidity	NTU	-	-	0.1	-	-	-	-	<0.10	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	87.9	149	187	148	-	80.7	84.7	113	80.3	211	264	278	-5%	275
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	87.9	149	187	148	167	80.7	84.7	113	80.3	211	264	278	-5%	275
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0075	0.0084	<0.0050	0.005	-	<0.0050	<0.0050	0.0074	0.0082	0.184	0.0236	0.0337	-43%	0.133
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<5.0	<5.0	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<5.0	-	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	0.055	***0.28***	***0.28***	***0.28***	0.106	0.053	0.053	0.082	0.061	<0.20	***0.32***	***0.28***	13%	***0.21***
Nitrate (as N)	mg/L	13	-	0.005	0.051	<0.050	<0.050	<0.050	0.145	0.0532	0.053	<0.0050	0.0393	0.107	<0.050	<0.050	-	0.1
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.010	<0.010	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.012	<0.010	<0.010	-	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	17.7	868	1030	855	34.8	14.4	15.2	68.6	163	491	477	480	-1%	647
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
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
Cyanate	mg/L	-	-	0.2	<0.20	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0453***	***0.0095***	***0.0306***	***0.0097***	<0.010	***0.0478***	***0.0471***	***0.0193***	***0.285***	***3.59***	0.0042	0.0042	0%	***0.119***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00011	0.00449	0.00368	0.00458	<0.00050	<0.00010	0.00011	0.00022	0.00156	0.00354	0.0189	0.0188	1%	0.00784
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00059	***0.00873***	***0.013***	***0.00871***	0.00038	0.00051	0.00049	0.00236	***0.0116***	***0.0314***	***0.0679***	***0.064***	6%	***0.0307***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0643	0.0147	0.0116	0.0141	0.084	0.0632	0.0652	0.066	0.0626	0.125	0.015	0.0148	1%	0.026
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<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
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010	<0.010	<0.010	0.028	<0.010	<0.010	-	0.055
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000025	***0.00305***	***0.00434***	***0.00307***	<0.00020	0.000019	0.000023	***0.000126***	***0.000043***	***0.000391***	***0.00439***	***0.00422***	4%	***0.000868***
Calcium (Ca)-Total	mg/L	-	-	0.05	24.8	258	314	273	43.3	24	24.4	49	67.3	153	185	181	2%	204
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00024	0.00012	0.0002	0.0002	<0.0020	0.00021	0.00022	0.00024	0.00058	0.00687	0.00016	0.00012	25%	0.00032
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00026	0.00069	0.0022	0.00119	0.00115	3%	0.00034
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0019	***0.0023***	***0.00353***	***0.00217***	<0.0010	0.00198	0.00184	0.0018	0.00186	***0.0109***	0.00055	<0.00050	11%	0.00162
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.12	0.023	0.106	0.025	<0.030	0.132	0.122	0.146	***1.55***	***6.76***	***1.39***	***1.37***	1%	***1.07***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000081	0.000414	0.0008	0.000415	0.0005	0.000074	0.000075	0.000096	0.00072	***0.00404***	0.000731	0.000577	21%	***0.00401***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00087	0.0074	0.00668	0.00566	-	0.00093	0.00109	0.00146	0.00062	0.00599	0.0088	0.00897	-2%	0.00741
Magnesium (Mg)-Total	mg/L	-	-	0.1	8.17	74	84.4	71.8	19.8	7.97	8.1	11.7	17.6	67.4	63.1	63.2	0%	91.1
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0612	0.0253	0.0835	0.0258	<0.0020	0.031	0.0351	***0.546***	***0.938***	***0.847***	***1.34***	***1.3***	3%	***0.902***
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.00020	<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	0.000457	0.0002	0.000129	0.000196	-	0.000409	0.000405	0.00084	0.000101	0.000707	0.000405	0.000382	6%	0.000276
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	0.00067	0.00068	0.00503	0.00238	0.00228	4%	0.00085
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	0.193	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.62	3.24	3.62	3.15	0.91	0.56	0.61	0.85	3.87	3.51	3.57	3.49	2%	4.32
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	0.0003	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	5.81	2.6	2.85	2.56	-	5.8	5.9	6.65	5.23	10.4	6.18	6.12	1%	6.16
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	0.000016	<0.000010	-	<0.000010	<0.000010	<0.000010	0.000015	0.000105	<0.000010	<0.000010	-	0.000038
Sodium (Na)-Total	mg/L	-	-	0.05	2.42	10.1	11.1	9.73	4.7	2.37	2.37	3.71	4.14	6.9	4.87	4.78	2%	7.11
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.28	0.894	1.09	0.957	-	0.278	0.277	0.321	0.211	0.5	0.455	0.453	0%	0.573
Sulfur (S)-Total	mg/L	-	-	0.5	6.11	278	315	273	-	5.01	5.24	22.7	55.1	152	156	156	0%	212
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.000089	0.000101	0.00009	-	<0.000010	<0.000010	<0.000010	0.000015	0.000058	0.000118	0.00011	7%	0.000046
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	0.01	0.163	<0.010	<0.010	-	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000554	0.00336	0.00396	0.00334	0.00199	0.000536	0.000507	0.00121	0.000145	0.0028	0.00458	0.00422	8%	0.00293
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	0.0013	0.0169	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	***0.292***	***0.419***	***0.297***	<0.050	<0.0030	<0.0030	<0.0030	0.0049	***0.0599***	***1.08***	***1.09***	-1%	***0.238***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0152***	0.0016	0.0026	***0.0126***	-	***0.0175***	***0.0164***	***0.0068***	***0.0087***	***0.0276***	0.0014	<0.0010	36%	0.0049
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.0001	0.00448	0.00375	0.00234	-	<0.00010	<0.00010	0.00023	0.00146	0.00247	0.0156	0.0176	-13%	0.00734
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00049	***0.00803***	***0.00794***	***0.0118***	-	0.00043	0.00041	0.0021	***0.00757***	***0.0062***	***0.0351***	***0.0398***	-13%	***0.0149***
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.063	0.0139	0.0134	0.0121	-	0.062	0.0635	0.0647	0.0581	0.0712	0.0176	0.0159	10%	0.0235

Table E-2. Water Quality Results for in situ, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-023 WQ-VC-DBC 8/14/2013	0167-130814-027 WQ-PIT-1 8/14/2013	0167-130814-028 WQ-PIT-2 8/14/2013	0167-130814-029 WQ-PIT-3 8/14/2013	0167-130814-030 WQ-PW 8/15/2013	0167-130814-026 WQ-VC-REF 8/14/2013	0167-130814-024 WQ-VC-U 8/14/2013	0167-130814-025 WQ-BC 8/14/2013	0167-130814-019 WQ-DC-DX 8/14/2013	0167-130814-014 WQ-DC-U2 8/14/2013	0167-130814-016 WQ-MS-S-03-r 8/14/2013	0167-130814-017 WQ-MS-S-03 8/14/2013	QA/QC WQ-MS-S-03-r	0167-130814-022 WQ-DC-D1b 8/14/2013
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	<0.010	-	<0.010	<0.010	<0.010	<0.010	0.026	<0.010	<0.010	-	0.048
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000022	***0.00301***	***0.00303***	***0.00433***	-	0.000015	0.000015	***0.000113***	0.000021	0.000021	***0.00218***	***0.00226***	-4%	***0.000282***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	24.7	263	276	360	-	23.6	24.1	48.4	67.4	160	186	183	2%	202
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.0001	<0.00010	<0.00010	<0.00010	-	0.0001	<0.00010	0.0001	0.00011	0.00011	<0.00010	<0.00010	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00024	0.00058	0.00053	0.00104	0.00109	-5%	0.00029
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00128	0.00164	0.00137	***0.00202***	-	0.00139	0.00127	0.00136	0.00097	***0.00304***	0.00033	<0.00020	-	0.00075
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.066	<0.010	<0.010	<0.010	-	0.068	0.066	0.082	***0.892***	***0.521***	***0.937***	***1.14***	-22%	0.096
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	0.000084	0.000062	0.000126	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00028	0.000179	36%	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00088	0.00697	0.00639	0.00709	-	0.00095	0.00107	0.00132	<0.00050	0.00425	0.00881	0.00893	-1%	0.0072
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	8.08	75	73.3	97.4	-	7.85	7.92	11.6	17.7	70.9	63.4	63.1	0%	91.9
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0575	0.0225	0.0241	0.117	-	0.0278	0.032	***0.524***	***0.886***	***0.785***	***1.22***	***1.26***	-3%	***0.856***
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	0.000427	0.00019	0.000158	0.000095	-	0.000389	0.000379	0.000804	0.000078	0.000414	0.000353	0.000355	-1%	0.000269
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	<0.00050	<0.00050	0.00058	-	<0.00050	<0.00050	0.00056	0.00052	0.00084	0.00201	0.00207	-3%	0.00075
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	0.59	3.28	3.1	3.94	-	0.55	0.56	0.85	3.82	3.29	3.65	3.56	2%	4.25
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	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.82	2.66	2.61	2.75	-	5.78	5.8	6.65	4.83	5.93	6.19	6.14	1%	5.89
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	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
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.43	9.76	9.4	13	-	2.31	2.3	3.62	3.95	6.83	4.81	4.7	2%	6.88
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.274	0.868	0.73	1.19	-	0.269	0.27	0.309	0.22	0.506	0.451	0.448	1%	0.554
Sulfur (S)-Dissolved	mg/L	-	-	0.5	6.02	276	269	354	-	4.84	5.06	22.5	54.9	157	150	152	-1%	204
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000091	0.000075	0.00009	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000094	0.000096	-2%	0.000038
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	0.000547	0.00335	0.00272	0.00405	-	0.000509	0.000494	0.00115	0.000134	0.00227	0.00432	0.00415	4%	0.00285
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	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	<0.0010	***0.288***	***0.292***	***0.454***	-	0.0019	<0.0010	0.0012	0.0014	0.0101	***0.929***	***1.03***	-11%	***0.19***

Table E-2. Water Quality Results for in situ, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-FIELD-BLANK FIELD BLANK 8/14/2013	0167-130814-TRAVEL-BLANK TRAVEL BLANK 8/16/2013
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	-	-	-	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-
Colour, True	CU	15	-	5	-	-
Conductivity	µS/cm	-	-	2	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	<0.50	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	***6.16***	***5.71***
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	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	1	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	0.0218
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
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	-

Applied Guidelines: **- Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life**
- Mount Nansen Effluent Discharge Standards

Color Key:
- Exceeds CCME Guideline
- Exceeds MN Effluent Quality Standards (EQS)
- Exceeds both CCME and EQS
- 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, lab analysis, and QA/QC program; August 13-15, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130814-FIELD-BLANK FIELD BLANK 8/14/2013	0167-130814-TRAVEL-BLANK TRAVEL BLANK 8/16/2013
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	<0.00020	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	<0.010	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	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	-
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	-

Table E-3. Water Quality Results for *in situ* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-006 WQ-DC-DX+105 9/24/2013	0167-130924-024 WQ-VC-UMN 9/24/2013	0167-130924-019 WQ-DC-D1b 9/24/2013	0167-130924-020 WQ-DC-U1 9/24/2013	0167-130924-018 WQ-TP 9/24/2013	0167-130924-021 WQ-MS-S-03 9/24/2013	0167-130924-016 WQ-DC-U2 9/24/2013	0167-130924-012 WQ-PC-D 9/24/2013	0167-130924-008 WQ-PC-D-r 9/24/2013	QA/QC WQ-PC-D-r	0167-130924-009 WQ-PC-U 9/24/2013	0167-130924-013 WQ-DC-U 9/24/2013	0167-130924-023 WQ-MN 9/24/2013
Temperature (in-situ)	°C	-	-	-	0.8	1.2	1.5	1.1	3.9	1.3	1.3	1.3	-	-	0.6	2.4	0.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	929.3	180.0	1235.0	811.7	1273.0	1173.0	942.0	277.6	-	-	238.3	850.9	51.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.93	7.42	7.61	7.61	7.73	7.16	7.40	7.31	-	-	7.30	7.40	7.65
Turbidity (lab)	NTU	-	-	-	1.95	2.48	2.84	0.71	3.12	28.70	36.80	0.37	0.33	-	0.75	25.20	5.25
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	766	176	1090	728	1100	998	863	283	263	7%	232	762	52.8
Hardness (as CaCO3)	mg/L	-	-	0.5	557	91.9	822	461	710	709	576	144	143	1%	115	481	26.8
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.53	7.87	8.1	7.87	8.13	7.52	7.83	7.57	7.43	2%	7.59	7.83	7.32
Total Suspended Solids	mg/L	-	50	3	4	12	<3.0	<3.0	3.3	17.3	***280***	6.7	<3.0	57%	<3.0	***61.3***	4.7
Total Dissolved Solids	mg/L	-	-	10	682	106	1020	583	1030	885	714	179	176	2%	146	631	30.1
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	225	71.6	253	139	93.9	291	168	66.7	62.2	7%	45.7	141	24.8
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	2.2	<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	225	71.6	255	139	93.9	291	168	66.7	62.2	7%	45.7	141	24.8
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0147	0.0075	0.0913	0.0143	0.064	0.0537	0.164	<0.0050	<0.0050	-	<0.0050	0.683	0.0101
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<5.0	<2.5	<5.0	<5.0	<5.0	<0.50	<0.50	-	<0.50	<5.0	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.054	<0.20	<0.10	***0.21***	<0.20	<0.20	0.055	0.056	-2%	0.05	<0.20	0.057
Nitrate (as N)	mg/L	13	-	0.005	<0.050	0.079	0.14	0.094	<0.050	<0.050	0.147	0.0465	0.0436	6%	0.0167	0.315	0.0316
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.010	<0.0050	<0.010	<0.010	<0.010	<0.0010	<0.0010	-	<0.0010	<0.010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	345	27.3	582	339	689	453	410	83.3	83.3	0%	73.8	367	2.33
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	0.0224	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	1.85	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0224***	***0.178***	***0.0248***	***0.098***	***0.0229***	***0.462***	***4.13***	***0.0369***	***0.0286***	22%	***0.0251***	***1.23***	***0.199***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00891	0.00022	0.00828	0.00223	0.0414	0.0147	0.00336	0.00198	0.00196	1%	0.00041	0.00162	0.00016
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0263***	0.00164	***0.0152***	***0.00637***	***0.143***	***0.103***	***0.0302***	***0.00556***	***0.00511***	8%	0.00142	***0.0192***	0.00152
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0192	0.056	0.0185	0.0178	0.00941	0.0258	0.122	0.0269	0.027	0%	0.0313	0.0651	0.0507
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<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
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	0.041	0.024	0.095	<0.010	0.022	<0.010	<0.010	-	<0.010	0.024	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00312***	***0.000041***	***0.000782***	0.000015	***0.000623***	***0.00309***	***0.00037***	***0.00082***	***0.00076***	7%	0.00002	***0.000166***	***0.000037***
Calcium (Ca)-Total	mg/L	-	-	0.05	147	23.8	193	105	216	181	131	41.6	41.4	0%	33.3	116	8.07
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00018	0.00048	0.00015	0.00037	0.00016	0.00033	0.00718	0.00019	0.00033	-74%	0.00019	0.00256	0.0008
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00041	0.00023	0.00026	0.0002	0.00075	0.00132	0.00268	<0.00010	<0.00010	-	<0.00010	0.00194	0.00064
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00103	0.00197	0.00114	0.00133	***0.0163***	***0.0114***	***0.01***	***0.00789***	***0.00756***	4%	0.00091	***0.00525***	***0.00295***
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.258	***0.436***	***0.486***	***0.62***	***0.313***	***3.25***	***7.55***	0.058	0.04	31%	0.114	***3.92***	***1.42***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000174	0.000296	***0.00101***	<0.000050	***0.00472***	***0.00518***	***0.00473***	0.000862	0.000511	41%	<0.000050	***0.00138***	0.000057
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00677	0.00067	0.00684	0.00261	0.00733	0.00929	0.0055	<0.00050	<0.00050	-	<0.00050	0.00228	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	47.3	7.83	83.3	48.5	47	57.8	56.4	9.69	9.78	-1%	7.93	41.6	1.95
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***0.839***	0.0854	***0.597***	0.0739	0.229	***1.33***	***0.671***	0.0285	0.0254	11%	0.0108	***1.07***	0.133
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	-	<0.000010	<0.000050	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000274	0.000335	0.000221	0.000223	0.00173	0.000339	0.000456	0.00006	0.000067	-12%	<0.000050	0.000399	0.000156
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00136	0.00068	0.00075	0.00067	0.00078	0.00207	0.00538	<0.00050	0.0005	-	<0.00050	0.00241	0.00238
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.283	<0.050	<0.050	-	<0.050	0.062	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.75	0.63	4.39	2.37	12.9	3.55	3.13	0.58	0.62	-7%	0.43	2.72	0.55
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00027	<0.00010	<0.00010	-	<0.00010	0.00017	0.00013
Silicon (Si)-Total	mg/L	-	-	0.05	6.42	6.6	5.82	6.19	1.53	7.33	11.8	6.37	6.49	-2%	6.92	8.02	8.65
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	0.000018	0.000017	<0.000010	0.000156	0.00014	0.000107	0.000024	0.000019	21%	<0.000010	0.000044	0.000012
Sodium (Na)-Total	mg/L	-	-	0.05	4.67	2.52	6.6	4.32	17.8	4.99	5.99	3.56	3.62	-2%	3.47	9.27	1.62
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.355	0.213	0.478	0.264	0.573	0.436	0.397	0.263	0.259	2%	0.221	0.354	0.0384
Sulfur (S)-Total	mg/L	-	-	0.5	117	9.24	199	114	235	149	136	28.6	29.3	-2%	25.6	119	1.08
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000084	0.000013	0.000032	<0.000010	0.000205	0.000091	0.000073	<0.000010	<0.000010	-	<0.000010	0.000023	<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	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.199	<0.010	<0.010	-	<0.010	0.06	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00341	0.000446	0.00279	0.00114	0.00106	0.00397	0.00224	0.000215	0.000195	9%	0.000117	0.00153	0.000098
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	0.0181	<0.0010	<0.0010	-	<0.0010	0.0058	0.0011
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.54***	0.004	***0.247***	0.0081	***0.0484***	***0.833***	***0.0656***	***0.0729***	***0.0697***	4%	<0.0030	0.0183	0.0046
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0075***	***0.0384***	0.0045	***0.0824***	0.0027	0.0012	***0.0172***	***0.0148***	***0.0148***	0%	***0.0138***	***0.0697***	***0.137***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00865	0.00016	0.00792	0.00227	0.0406	0.0141	0.00236	0.00189	0.00177	6%	0.00039	0.00128	0.00014
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.00992***	0.00098	***0.0115***	***0.00577***	***0.0973***	***0.0728***	***0.00561***	0.00467	0.00482	-3%	0.00126	***0.00995***	0.00111
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0183	0.0533	0.0179	0.0179	0.00894	0.0179	0.0541	0.0264	0.0268	-2%	0.0313	0.0465	0.0469

Table E-3. Water Quality Results for *in situ* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-006 WQ-DC-DX+105 9/24/2013	0167-130924-024 WQ-VC-UMN 9/24/2013	0167-130924-019 WQ-DC-D1b 9/24/2013	0167-130924-020 WQ-DC-U1 9/24/2013	0167-130924-018 WQ-TP 9/24/2013	0167-130924-021 WQ-MS-S-03 9/24/2013	0167-130924-016 WQ-DC-U2 9/24/2013	0167-130924-012 WQ-PC-D 9/24/2013	0167-130924-008 WQ-PC-D-r 9/24/2013	QA/QC WQ-PC-D-r	0167-130924-009 WQ-PC-U 9/24/2013	0167-130924-013 WQ-DC-U 9/24/2013	0167-130924-023 WQ-MN 9/24/2013
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	0.033	0.019	0.085	<0.010	0.016	<0.010	<0.010	-	<0.010	0.02	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00167***	0.000022	***0.00046***	0.000012	***0.000488***	***0.0008***	0.000021	***0.000843***	***0.000802***	5%	0.000018	***0.000046***	0.000025
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	145	24	192	105	209	185	134	41.7	41.2	1%	33.1	120	7.69
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	0.00018	<0.00010	0.00026	<0.00010	<0.00010	0.00012	0.0001	0.0001	0%	0.00012	0.00028	0.00059
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00037	0.00015	0.00024	0.00019	0.00068	0.00108	0.00049	<0.00010	<0.00010	-	<0.00010	0.00135	0.00053
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00062	0.00143	0.00074	0.00114	***0.0127***	<0.00020	0.00057	***0.00737***	***0.00691***	6%	0.00073	0.00149	***0.00255***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.087	0.148	0.217	***0.503***	0.032	***2.08***	***0.72***	0.019	0.018	5%	0.063	***1.13***	***0.82***
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000368	0.000137	<0.000050	0.000244	0.000229	6%	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00623	<0.00050	0.00628	0.00257	0.007	0.00863	0.0029	<0.00050	<0.00050	-	<0.00050	0.00153	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	47.4	7.76	83.2	48.1	45.6	60.1	58.8	9.72	9.66	1%	7.74	44	1.85
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***0.801***	0.0665	***0.584***	0.0736	0.197	***1.26***	***0.562***	0.0272	0.0241	11%	0.00916	***1.02***	0.118
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	0.000243	0.000291	0.000207	0.000208	0.00165	0.000302	0.00024	0.000055	0.000053	4%	<0.000050	0.000332	0.00015
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00127	0.00051	0.00071	0.00068	0.00074	0.00183	0.00072	<0.00050	<0.00050	-	<0.00050	0.00106	0.00221
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	3.64	0.6	4.3	2.27	12.5	3.63	2.86	0.59	0.58	2%	0.4	2.67	0.51
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	0.00011	0.00012
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.29	6.37	5.67	6.16	1.41	6.4	6.02	6.39	6.41	0%	6.86	6.48	8.23
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.45	2.44	6.49	4.27	17	4.8	5.74	3.5	3.5	0%	3.42	9.31	1.53
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.334	0.209	0.462	0.261	0.558	0.421	0.374	0.257	0.253	2%	0.22	0.362	0.0369
Sulfur (S)-Dissolved	mg/L	-	-	0.5	112	9.18	194	110	221	147	138	28.6	28.4	1%	24.9	121	1.01
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000072	<0.000010	0.000028	<0.000010	0.0002	0.000074	<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
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	0.00325	0.000402	0.00266	0.00112	0.00102	0.00402	0.00152	0.000204	0.000183	10%	0.000111	0.00139	0.00008
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	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.526***	0.0022	***0.24***	0.0072	***0.0332***	***0.857***	0.0148	***0.0742***	***0.0731***	1%	0.0015	0.0044	0.0032

Table E-3. Water Quality Results for *in situ* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-004 WQ-DC-DX 9/24/2013	0167-130924-011 WQ-VC-DBC 9/24/2013	0167-130924-026 WQ-DC-R 9/24/2013	0167-130924-010 WQ-VC-REF 9/24/2013	0167-130924-022 WQ-VC-U 9/24/2013	0167-130924-014 WQ-BC 9/24/2013	0167-130924-025 WQ-VC-R 9/24/2013	0167-130924-029 WQ-PIT-1 9/24/2013	0167-130924-028 WQ-PIT-3 9/24/2013	0167-130924-027 WQ-PIT-2 9/24/2013	0167-130924-015 WQ-SEEP-r 9/24/2013	0167-130924-017 WQ-SEEP 9/24/2013	QA/QC WQ-SEEP-r
Temperature (in-situ)	°C	-	-	-	1.2	1.4	0.5	1.9	1.4	2.3	1.0	5.2	6.8	5.6	-	3.4	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	472.4	150.5	731.7	136.9	138.6	270.5	159.8	1694.0	2664.0	1810.0	-	1621.0	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.65	7.34	7.21	7.42	7.38	7.67	8.20	7.73	6.66	6.96	-	6.93	-
Turbidity (lab)	NTU	-	-	-	2.82	1.59	25.70	2.14	2.56	3.03	2.43	0.73	0.63	0.65	103.00	101.00	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	10.2	6.0	9.4	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	455	165	662	139	158	284	164	1510	1570	1530	1460	1440	1%
Hardness (as CaCO3)	mg/L	-	-	0.5	240	79.3	397	70.9	73.5	143	82.7	1140	1170	1120	881	894	-1%
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.66	7.76	7.67	7.78	7.76	7.97	7.78	8	7.88	8.06	7.03	7.05	0%
Total Suspended Solids	mg/L	-	50	3	14	6	42.7	5.3	4.7	9.3	6	<3.0	3.3	<3.0	26	23.3	10%
Total Dissolved Solids	mg/L	-	-	10	310	89.2	513	78.6	80.4	171	94.1	1470	1520	1460	1290	1300	-1%
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	81.5	69.1	126	65.7	66.5	89.9	63.9	168	171	167	259	259	0%
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<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	81.5	69.1	126	65.7	66.5	89.9	63.9	168	171	168	259	259	0%
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0068	<0.0050	0.512	<0.0050	<0.0050	0.0086	0.0085	<0.0050	0.0073	<0.0050	***4.6***	***4.57***	1%
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<5.0	<5.0	<5.0	<5.0	-
Fluoride (F)	mg/L	0.12	-	0.02	0.068	0.054	0.082	0.054	0.052	0.072	0.055	***0.22***	***0.22***	***0.21***	<0.20	<0.20	-
Nitrate (as N)	mg/L	13	-	0.005	0.0417	0.0647	0.265	0.0652	0.0684	0.0257	0.0693	<0.050	<0.050	<0.050	1.64	1.64	0%
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	0.0088	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.010	<0.010	0.026	0.028	-8%
Sulfate (SO4)	mg/L	-	-	0.5	168	17.1	286	11.7	12.1	61.7	23.4	955	994	953	747	744	0%
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	0.0057	0.0078	-37%
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	0.0052	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	0.0721	0.0736	-2%
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	1.89	1.62	14%
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	2.95	2.93	1%
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.08***	***0.169***	***0.84***	***0.182***	***0.167***	***0.208***	***0.218***	***0.0123***	***0.0133***	***0.0076***	***0.022***	***0.025***	-14%
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00117	0.00014	0.0014	0.00013	0.00013	0.00038	0.00022	0.00352	0.00342	0.00348	0.00052	0.0005	4%
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00331	0.00091	***0.0268***	0.00065	0.00062	0.00377	0.00182	***0.0119***	***0.012***	***0.0116***	***0.045***	***0.0443***	2%
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0549	0.0595	0.0578	0.0554	0.0573	0.0579	0.0562	0.0118	0.0112	0.0115	0.0717	0.0718	0%
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	-
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	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	0.02	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.074	0.074	0%
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00002	***0.000035***	***0.000135***	0.000028	0.000028	***0.000136***	***0.000042***	***0.00268***	***0.00319***	***0.00261***	***0.000529***	***0.000514***	3%
Calcium (Ca)-Total	mg/L	-	-	0.05	65.9	20.9	97.3	18.5	19	41.1	22.1	308	318	287	278	260	6%
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00026	0.00054	0.0019	0.00048	0.00047	0.00049	0.00055	0.00019	0.00011	0.00018	0.00051	0.00054	-6%
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00019	0.00021	0.00162	0.00022	0.00022	0.00035	0.00032	<0.00010	0.0001	<0.00010	0.00862	0.00846	2%
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00125	0.00181	***0.00404***	0.00182	0.00196	***0.00231***	***0.00211***	***0.00298***	***0.00264***	***0.00249***	***0.00553***	***0.00526***	5%
Iron (Fe)-Total	mg/L	0.3	1	0.01	***0.345***	***0.395***	***4.19***	***0.389***	***0.359***	***0.528***	***0.671***	0.129	0.096	0.051	***10.2***	***9.39***	8%
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000149	0.000417	***0.00145***	0.000221	0.000229	0.000573	0.000298	***0.00119***	***0.00138***	0.000913	0.000087	0.000085	2%
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	0.00159	<0.00050	<0.00050	0.00096	0.0006	0.00855	0.00839	0.00799	0.00051	<0.00050	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	18.2	6.8	33.6	6.22	6.3	10.2	7.09	88.6	90.1	83.4	54.4	50.4	7%
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.15	0.0694	***1***	0.0363	0.0397	0.42	0.0988	0.0527	0.126	0.0506	***5.94***	***5.98***	-1%
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	<0.000010	<0.000010	-
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	<0.000050	0.000337	0.000374	0.000284	0.00035	0.000812	0.000329	0.000156	0.000145	0.00016	0.000992	0.000957	4%
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	0.00064	0.00207	0.00063	0.00064	0.00083	0.00105	0.00222	0.00058	<0.00050	0.00295	0.00292	1%
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	4.6	0.56	2.12	0.5	0.51	0.79	0.64	3.66	3.69	3.58	7.2	6.33	12%
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00021	0.0002	5%
Silicon (Si)-Total	mg/L	-	-	0.05	4.95	6.71	7.4	6.49	6.52	7.5	7.34	2.86	2.87	2.76	6.75	6.25	7%
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	0.000039	<0.000010	0.00001	0.000014	0.000018	0.000017	0.000024	0.000017	0.00003	0.000026	13%
Sodium (Na)-Total	mg/L	-	-	0.05	3.76	2.13	8.5	2	2.07	3.47	2.4	11.7	11.8	11.4	41.4	39.6	4%
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.211	0.206	0.301	0.198	0.203	0.264	0.195	0.985	0.999	0.979	0.802	0.797	1%
Sulfur (S)-Total	mg/L	-	-	0.5	58.1	5.74	94.5	4.1	4.23	21.5	8.14	322	329	325	263	251	5%
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	0.00001	0.000072	0.000075	0.000072	0.000012	0.000011	8%
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	-
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	0.036	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000111	0.000405	0.00119	0.000358	0.000358	0.000928	0.000388	0.00394	0.00393	0.00376	0.00329	0.00317	4%
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	0.0043	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0017	0.0016	6%
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0064	0.0034	0.0162	0.0037	0.0036	0.0057	0.0078	***0.29***	***0.308***	***0.279***	0.0072	0.0082	-14%
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0072***	***0.0403***	***0.0646***	***0.045***	***0.0414***	***0.0197***	***0.0516***	0.0011	0.0024	0.0012	***0.0103***	***0.0106***	-3%
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00111	0.00011	0.00109	<0.00010	0.0001	0.0003	0.00016	0.00352	0.00326	0.00347	0.00046	0.00047	-2%
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00239	0.00053	***0.0132***	0.00041	0.00039	0.00261	0.00102	***0.00917***	***0.0087***	***0.00913***	***0.0341***	***0.0341***	0%
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0531	0.0541	0.045	0.0536	0.0539	0.0527	0.0516	0.0118	0.011	0.0115	0.0681	0.0693	-2%

Table E-3. Water Quality Results for *in situ* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-004 WQ-DC-DX 9/24/2013	0167-130924-011 WQ-VC-DBC 9/24/2013	0167-130924-026 WQ-DC-R 9/24/2013	0167-130924-010 WQ-VC-REF 9/24/2013	0167-130924-022 WQ-VC-U 9/24/2013	0167-130924-014 WQ-BC 9/24/2013	0167-130924-025 WQ-VC-R 9/24/2013	0167-130924-029 WQ-PIT-1 9/24/2013	0167-130924-028 WQ-PIT-3 9/24/2013	0167-130924-027 WQ-PIT-2 9/24/2013	0167-130924-015 WQ-SEEP-r 9/24/2013	0167-130924-017 WQ-SEEP 9/24/2013	QA/QC WQ-SEEP-r
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	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.067	0.066	1%
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000015	0.000026	0.000033	0.000018	0.000017	***0.000086***	0.000022	***0.00261***	***0.0031***	***0.0026***	***0.00036***	***0.00036***	0%
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	65.9	20.7	99.6	18.4	19	40.9	21.8	309	319	306	265	271	-2%
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	0.00019	0.00035	0.00018	0.00018	0.00015	0.00026	<0.00010	<0.00010	<0.00010	0.00035	0.00039	-11%
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00014	0.00013	0.00121	0.00013	0.00013	0.00024	0.0002	<0.00010	<0.00010	<0.00010	0.00815	0.00825	-1%
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00097	0.00144	0.00143	0.0014	0.00142	0.00172	0.00159	0.00189	0.00182	0.0018	***0.00278***	***0.00278***	0%
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.193	0.133	***1.67***	0.129	0.126	0.164	0.257	0.015	<0.010	<0.010	***7.05***	***7.06***	0%
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	0.000069	<0.000050	<0.000050	<0.000050	<0.000050	0.000096	0.000101	0.0001	<0.000050	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	0.00116	<0.00050	<0.00050	0.00082	<0.00050	0.00793	0.00802	0.00787	<0.00050	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	18.2	6.69	36	6.07	6.32	10	6.87	90.1	92.1	86.7	53.1	52.8	1%
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.116	0.0583	***0.954***	0.0291	0.0308	0.387	0.0749	0.0494	0.125	0.0477	***5.7***	***5.95***	-4%
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	<0.000050	0.000282	0.000314	0.000245	0.000254	0.000728	0.000267	0.000143	0.000139	0.000149	0.000929	0.000919	1%
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	0.00055	0.00123	0.00057	0.00052	0.00061	0.00078	<0.00050	<0.00050	<0.00050	0.00266	0.00279	-5%
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	4.63	0.51	2.12	0.47	0.48	0.75	0.59	3.66	3.68	3.83	6.9	6.78	2%
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	0.00025	0.00024	4%
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.86	6.48	6.48	6.27	6.43	7.13	6.97	2.85	2.87	2.89	6.34	6.38	-1%
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	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	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	3.61	2.16	8.45	2	2.04	3.36	2.31	11.3	11.6	11.1	39.4	39	1%
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.206	0.201	0.306	0.195	0.196	0.255	0.181	0.961	0.989	0.968	0.775	0.791	-2%
Sulfur (S)-Dissolved	mg/L	-	-	0.5	57.1	5.52	96.5	4	4.19	20.7	7.95	313	323	328	247	253	-2%
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00007	0.00007	0.000071	0.000011	0.00001	9%
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	0.000104	0.000375	0.00112	0.000336	0.000341	0.000892	0.000344	0.00374	0.00378	0.00374	0.00311	0.00316	-2%
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0012	0%
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0018	0.0015	0.0068	0.0031	0.0014	0.0021	0.0015	***0.283***	***0.311***	***0.275***	0.006	0.0066	-10%

Table E-3. Water Quality Results for *in situ* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-003 WQ-DRY 9/24/2013	0167-130924-030 WQ-PW 9/24/2013	TRAVEL 9/24/2013	FIELD 9/24/2013
Temperature (in-situ)	°C	-	-	-	0.6	2.0	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	348.5	394.4	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.55	8.22	-	-
Turbidity (lab)	NTU	-	-	-	0.59	<0.10	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	<5.0	-	-
Conductivity	µS/cm	-	-	2	339	341	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	190	192	-	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.94	7.86	***5.99***	***5.68***
Total Suspended Solids	mg/L	-	50	3	6	-	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	208	203	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	170	-	<1.0	1.4
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	4.3	-	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	174	167	<1.0	1.4
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	-	0.0152	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.063	0.107	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.404	0.146	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	29.8	32.5	<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
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	-	-	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0437***	<0.010	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00031	<0.00050	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00203	0.00038	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0786	0.088	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.10	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.000010	<0.00020	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	54.6	43.2	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00017	<0.0020	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	-	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0007	<0.0010	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	***0.676***	<0.030	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	<0.000050	0.0006	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00131	-	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	14.1	20.5	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0108	<0.0020	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.00020	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000056	-	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	-	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	-	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	2.71	0.9	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.0010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	5.43	-	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	2.51	5.1	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.151	-	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	10.2	-	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	-	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	-	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000323	0.00191	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	-	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	<0.050	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0039	-	-	<0.0010
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00026	-	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00058	-	-	<0.00010
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0764	-	-	<0.000050

Applied Guidelines: **- Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life**
- Mount Nansen Effluent Discharge Standards

Color Key:
- Exceeds CCME Guideline
- Exceeds MN Effluent Quality Standards (EQS)
- Exceeds both CCME and EQS
- 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* , lab analysis, and QA/QC program; September 23-25, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130924-003 WQ-DRY 9/24/2013	0167-130924-030 WQ-PW 9/24/2013	TRAVEL 9/24/2013	FIELD 9/24/2013
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	<0.000010	-	-	<0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	53.6	-	-	<0.050
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	-	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	-	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00048	-	-	<0.00020
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.03	-	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	-	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00109	-	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	13.6	-	-	<0.10
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.00134	-	-	<0.000050
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	-	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000054	-	-	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	-	-	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.55	-	-	<0.10
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	-	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.15	-	-	<0.050
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	-	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.42	-	-	<0.050
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.143	-	-	<0.00020
Sulfur (S)-Dissolved	mg/L	-	-	0.5	9.79	-	-	<0.50
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	0.000295	-	-	<0.000010
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.0579***	-	-	<0.0010

APPENDIX F Q2 METEOROLOGICAL DATA

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Table F-1. Mount Nansen Daily Meteorological Data (April 1, 2013 to September 30, 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.	Mean	Max.	Max.	Mean	Mean
01/04/2013	-6.52	-1.58	-4.26	-3.72	-3.47	-3.6	0.2	0.0	67	2.04	1.16	203
02/04/2013	-8.58	-3.88	-6.56	-3.48	-3.28	-3.4	2.1	0.1	195	5.22	3.03	266
03/04/2013	-12.49	-3.38	-7.79	-3.30	-3.26	-3.3	0.2	0.0	70	4.24	1.95	225
04/04/2013	-17.72	-12.13	-14.96	-3.73	-3.28	-3.5	0.0	0.0	69	4.32	2.41	155
05/04/2013	-17.96	-11.67	-14.80	-4.31	-3.79	-4.1	0.0	0.0	68	4.38	3.11	75
06/04/2013	-17.90	-7.02	-12.72	-5.78	-4.31	-5.2	0.0	0.0	68	5.43	4.22	57
07/04/2013	-6.89	1.18	-1.93	-5.33	-3.47	-4.3	0.0	0.0	67	7.52	5.02	148
08/04/2013	-4.05	0.21	-1.93	-3.45	-2.97	-3.2	0.0	0.0	66	6.63	4.89	165
09/04/2013	-7.72	1.16	-2.37	-3.02	-2.62	-2.9	0.0	0.0	66	12.69	6.67	146
10/04/2013	-12.14	-5.30	-8.32	-2.80	-2.63	-2.7	0.0	0.0	64	7.03	3.90	210
11/04/2013	-13.61	-6.08	-10.30	-3.19	-2.82	-3.1	0.0	0.0	63	5.29	2.03	153
12/04/2013	-13.55	-8.90	-11.49	-3.87	-3.21	-3.6	0.0	0.0	63	5.99	4.84	84
13/04/2013	-14.48	-6.64	-10.73	-4.01	-3.83	-3.9	0.0	0.0	63	3.47	1.71	232
14/04/2013	-13.36	-5.85	-9.45	-3.98	-3.82	-3.9	0.0	0.0	63	3.39	1.46	266
15/04/2013	-10.64	-2.25	-6.99	-4.06	-3.77	-3.9	0.0	0.0	63	3.90	3.06	121
16/04/2013	-9.92	-4.48	-6.81	-3.77	-3.40	-3.6	0.0	0.0	69	3.64	1.69	122
17/04/2013	-8.84	-1.61	-6.02	-3.38	-3.07	-3.2	3.0	0.2	70	3.94	1.49	236
18/04/2013	-12.13	-7.67	-9.84	-3.07	-3.00	-3.0	0.6	0.0	70	4.10	2.77	282
19/04/2013	-13.75	-6.61	-10.79	-3.10	-3.00	-3.0	0.2	0.0	70	3.36	2.11	266
20/04/2013	-13.31	-3.12	-7.54	-3.22	-3.10	-3.2	0.3	0.0	69	3.56	1.68	198
21/04/2013	-9.80	0.15	-4.58	-3.26	-3.20	-3.2	0.0	0.0	69	3.86	1.83	215
22/04/2013	-6.65	2.03	-2.26	-3.24	-3.09	-3.2	0.0	0.0	68	3.73	1.83	227
23/04/2013	-5.58	2.63	-1.15	-3.09	-2.91	-3.0	0.0	0.0	67	4.20	2.30	228
24/04/2013	-6.26	-2.28	-3.42	-2.91	-2.62	-2.8	1.0	0.1	71	4.01	2.78	259
25/04/2013	-9.51	-3.81	-6.61	-2.62	-2.47	-2.5	0.1	0.0	71	5.19	2.71	223
26/04/2013	-13.88	-7.48	-10.34	-2.63	-2.45	-2.5	0.0	0.0	70	6.37	2.43	278
27/04/2013	-12.80	-6.70	-9.95	-2.88	-2.65	-2.8	0.0	0.0	69	2.61	1.56	276
28/04/2013	-17.27	-9.52	-13.11	-3.27	-2.88	-3.1	0.0	0.0	69	3.35	2.15	285
29/04/2013	-14.90	-4.49	-9.29	-3.34	-3.27	-3.3	0.0	0.0	69	3.82	2.32	270
30/04/2013	-10.06	-2.65	-6.13	-3.26	-3.03	-3.2	0.0	0.0	69	2.92	2.07	219
01/05/2013	-7.99	-1.91	-4.29	-3.02	-2.77	-2.9	0.2	0.0	70	4.16	1.90	136
02/05/2013	-2.57	5.57	1.62	-2.77	-0.11	-1.9	0.0	0.0	70	6.46	3.42	207
03/05/2013	-0.27	6.33	2.97	-0.50	0.04	-0.2	0.0	0.0	64	6.72	4.95	191
04/05/2013	0.51	6.15	3.38	0.01	0.17	0.1	0.0	0.0	59	9.68	5.17	182
05/05/2013	-2.12	1.78	0.08	-0.73	0.11	-0.2	0.0	0.0	45	8.99	3.19	225
06/05/2013	-4.60	2.02	-1.68	-0.67	0.14	-0.3	0.0	0.0	40	2.91	1.45	216
07/05/2013	-3.28	3.41	-0.18	-1.13	0.22	-0.4	0.0	0.0	37	2.51	1.47	240
08/05/2013	-1.51	4.97	1.88	-0.87	0.26	-0.2	0.0	0.0	34	1.87	1.13	228
09/05/2013	-2.66	6.74	2.73	-1.21	0.42	-0.2	0.0	0.0	33	2.93	2.01	174
10/05/2013	2.32	11.55	6.96	-0.32	1.06	0.4	0.0	0.0	30	2.72	1.69	101
11/05/2013	2.66	10.65	5.99	-0.03	1.86	0.8	0.9	0.2	26	3.31	1.76	190

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.	Mean	Max.	Max.	Mean	Mean
12/05/2013	0.00	6.15	2.65	0.12	2.97	1.2	0.5	0.1	21	4.67	2.90	238
13/05/2013	0.77	6.48	3.40	-0.03	4.91	2.2	0.2	0.0	17	7.75	3.90	194
14/05/2013	-0.67	5.23	2.44	-1.07	4.72	1.6	0.0	0.0	13	6.36	4.04	197
15/05/2013	-2.19	4.05	1.19	-1.27	4.47	1.3	1.1	0.1	12	6.44	3.23	204
16/05/2013	-2.53	5.07	1.34	-1.76	5.18	1.3	0.0	0.0	11	7.44	3.79	194
17/05/2013	-0.30	6.93	3.07	-0.72	4.84	1.6	0.0	0.0	8	8.40	5.89	172
18/05/2013	-4.26	7.33	3.60	-1.45	7.69	3.1	0.0	0.0	5	7.89	5.86	180
19/05/2013	-9.25	-5.55	-7.28	-4.40	-2.02	-3.2	0.0	0.0	2	5.67	3.99	263
20/05/2013	-9.09	0.29	-4.50	-5.15	0.38	-2.2	0.1	0.0	1	3.50	2.19	229
21/05/2013	-3.84	5.62	1.33	-3.91	5.16	1.1	0.0	0.0	1	3.25	2.00	102
22/05/2013	0.51	8.17	4.19	-1.33	10.59	4.2	0.0	0.0	0	5.18	3.00	66
23/05/2013	0.17	11.65	6.36	-1.01	11.24	5.7	0.0	0.0	0	3.88	1.95	146
24/05/2013	5.51	13.27	9.95	1.87	12.66	8.1	0.0	0.0	0	4.62	3.11	55
25/05/2013	7.80	16.27	11.67	5.64	16.78	10.5	0.0	0.0	1	3.16	1.97	141
26/05/2013	8.21	17.43	12.98	6.61	18.66	12.9	0.0	0.0	1	6.63	3.89	188
27/05/2013	9.64	18.65	13.97	6.49	20.45	13.0	0.0	0.0	1	4.29	2.01	154
28/05/2013	9.09	16.77	13.33	9.79	17.60	13.0	0.1	0.0	0	4.71	2.65	192
29/05/2013	7.33	17.87	12.35	5.46	20.68	13.0	0.0	0.0	0	4.65	2.08	153
30/05/2013	9.39	17.11	12.12	8.72	21.66	13.0	6.0	0.3	0	3.48	1.99	183
31/05/2013	9.37	18.67	13.45	6.04	19.98	13.4	0.4	0.0	0	4.34	1.90	185
01/06/2013	5.86	14.80	10.65	8.12	17.44	11.9	0.6	0.0	0	3.84	1.79	175
02/06/2013	3.39	12.63	7.45	6.10	14.39	9.8	0.7	0.1	0	3.07	1.53	163
03/06/2013	4.07	13.90	9.06	4.27	18.06	11.3	0.0	0.0	1	6.82	3.58	178
04/06/2013	1.77	11.64	6.34	2.48	16.98	9.8	0.0	0.0	1	7.48	4.36	204
05/06/2013	-0.19	7.06	3.20	2.26	11.00	5.7	4.3	0.5	1	5.37	2.73	219
06/06/2013	1.93	11.34	7.33	2.33	13.83	8.4	0.1	0.0	1	3.46	2.47	157
07/06/2013	6.46	12.70	9.45	5.01	14.22	9.9	0.1	0.0	0	5.62	2.72	124
08/06/2013	5.88	11.44	8.40	4.97	11.59	8.6	2.5	0.2	0	3.62	1.84	249
09/06/2013	7.44	16.07	11.53	6.35	17.12	11.6	0.0	0.0	1	3.68	2.20	218
10/06/2013	7.13	13.63	10.09	7.83	15.62	10.8	1.5	0.2	0	3.55	2.33	236
11/06/2013	5.44	9.45	6.80	6.01	10.90	8.1	2.5	0.2	0	2.13	1.38	237
12/06/2013	4.45	11.24	7.52	5.24	13.00	8.8	0.3	0.0	1	4.92	1.91	176
13/06/2013	4.58	10.91	7.08	4.80	13.36	8.8	1.3	0.1	1	5.35	1.88	149
14/06/2013	4.37	15.59	9.82	2.67	17.76	10.8	0.0	0.0	1	2.56	1.28	186
15/06/2013	9.52	19.75	15.10	6.47	21.74	15.4	0.0	0.0	0	3.20	1.74	186
16/06/2013	13.60	21.50	17.76	11.58	22.38	17.3	0.0	0.0	0	3.04	2.17	271
17/06/2013	7.01	15.86	11.77	9.48	16.86	13.7	0.0	0.0	1	7.22	4.37	112
18/06/2013	3.83	15.29	10.22	5.21	18.73	12.6	0.0	0.0	0	5.61	4.27	65
19/06/2013	8.16	18.18	13.79	8.27	22.32	16.1	0.0	0.0	1	3.19	2.14	116
20/06/2013	10.77	17.88	14.65	10.07	21.11	16.0	1.2	0.1	1	4.80	1.58	129
21/06/2013	8.73	19.20	13.21	10.24	19.31	14.5	1.9	0.1	1	4.14	2.22	163
22/06/2013	10.85	20.26	15.52	8.72	24.93	16.7	0.0	0.0	1	3.51	2.06	181
23/06/2013	10.46	17.88	14.13	11.26	23.58	17.2	0.0	0.0	1	4.40	2.47	199

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.	Mean	Max.	Max.	Mean	Mean
24/06/2013	11.26	23.19	17.67	9.86	27.97	19.7	0.0	0.0	1	5.02	2.31	98
25/06/2013	16.30	24.11	20.18	15.94	29.44	22.2	0.0	0.0	1	6.05	4.02	75
26/06/2013	14.38	22.32	18.68	14.81	29.22	21.8	0.0	0.0	1	3.63	2.32	93
27/06/2013	15.96	25.73	20.48	14.50	31.18	23.2	0.0	0.0	1	4.07	2.06	174
28/06/2013	10.25	18.17	14.74	13.46	23.80	18.6	1.4	0.1	2	4.59	2.30	180
29/06/2013	10.41	19.00	14.42	13.02	26.69	18.6	0.4	0.0	1	3.37	1.81	207
30/06/2013	11.48	20.59	15.92	11.92	28.30	20.3	0.0	0.0	1	5.44	2.65	180
01/07/2013	9.60	17.97	13.10	11.21	25.23	17.4	0.0	0.0	1	6.75	4.75	184
02/07/2013	6.86	15.76	11.09	9.55	23.24	16.0	0.1	0.0	1	6.42	4.15	208
03/07/2013	4.88	11.30	7.41	8.33	16.24	11.5	2.7	0.2	12	4.87	3.11	239
04/07/2013	4.04	13.02	8.17	5.91	15.63	10.5	0.6	0.1	4	3.21	2.06	235
05/07/2013	5.62	16.03	11.13	7.10	22.64	14.7	0.0	0.0	1	4.36	2.53	199
06/07/2013	6.80	16.61	12.06	8.95	22.87	16.1	0.0	0.0	1	3.56	1.83	165
07/07/2013	6.15	14.83	10.35	7.92	21.93	15.0	0.0	0.0	1	7.41	4.36	189
08/07/2013	7.08	14.73	10.42	9.65	21.19	14.4	0.0	0.0	1	8.07	4.85	185
09/07/2013	4.07	11.39	6.18	7.75	17.78	10.8	1.7	0.1	14	3.87	2.29	216
10/07/2013	3.14	10.54	6.61	5.58	14.24	9.4	2.0	0.2	3	2.92	1.44	202
11/07/2013	6.42	11.51	8.64	7.44	12.22	9.6	0.7	0.1	1	2.70	1.97	266
12/07/2013	4.94	12.79	8.58	5.55	15.83	10.2	0.2	0.0	1	3.28	1.89	197
13/07/2013	5.44	15.29	10.56	5.17	20.27	13.4	0.0	0.0	1	3.78	2.23	133
14/07/2013	8.34	21.30	15.21	6.65	24.74	16.7	0.0	0.0	1	3.41	1.54	212
15/07/2013	14.52	22.69	18.36	13.17	24.28	19.4	0.0	0.0	1	3.33	2.16	276
16/07/2013	12.16	21.06	15.12	12.67	24.02	16.3	1.0	0.1	2	4.14	2.14	235
17/07/2013	10.63	19.12	14.34	11.02	22.50	16.1	0.6	0.0	2	3.54	1.24	172
18/07/2013	9.46	18.60	13.92	10.81	22.39	16.6	0.4	0.0	2	2.62	1.57	253
19/07/2013	9.82	16.60	12.84	11.81	18.72	14.8	1.7	0.2	1	3.88	2.03	228
20/07/2013	7.19	12.49	9.23	9.26	15.62	11.2	5.4	0.6	4	3.62	1.96	247
21/07/2013	7.49	10.70	8.93	8.84	12.80	10.6	2.1	0.4	5	3.03	1.81	271
22/07/2013	8.53	14.41	10.52	9.31	14.94	11.6	1.1	0.1	1	6.45	3.35	72
23/07/2013	9.83	17.83	13.33	7.37	21.53	14.5	0.3	0.0	1	3.48	1.21	208
24/07/2013	10.86	18.00	14.01	9.12	20.77	14.5	3.4	0.2	2	3.40	1.40	193
25/07/2013	7.64	11.84	9.50	9.53	15.85	12.0	3.6	0.8	13	3.97	2.26	225
26/07/2013	8.76	15.47	11.93	10.01	17.41	13.5	1.2	0.1	2	2.98	1.60	244
27/07/2013	9.74	16.14	12.79	9.61	17.47	13.2	0.3	0.0	1	3.21	1.92	268
28/07/2013	10.85	18.27	14.64	11.23	19.30	15.3	0.9	0.1	1	2.81	1.58	259
29/07/2013	11.66	22.62	17.13	10.13	25.35	17.9	0.0	0.0	12	2.93	1.77	206
30/07/2013	13.92	20.70	16.47	12.35	23.44	17.1	0.0	0.0	1	2.57	1.73	258
31/07/2013	11.10	19.66	15.20	11.32	22.79	16.3	0.0	0.0	12	4.99	1.59	199
01/08/2013	9.23	19.45	14.37	9.76	23.84	16.9	0.0	0.0	1	4.05	1.36	151
02/08/2013	12.97	22.60	17.74	10.66	28.53	19.3	0.0	0.0	1	3.63	1.93	185
03/08/2013	11.25	18.33	14.58	10.30	23.18	17.1	0.0	0.0	1	5.33	3.44	191
04/08/2013	8.94	14.93	11.92	10.19	20.27	15.0	0.0	0.0	1	3.50	2.45	202
05/08/2013	6.81	16.91	11.15	8.73	22.06	13.7	0.7	0.0	195	3.24	2.09	201

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.	Mean	Max.	Max.	Mean	Mean
06/08/2013	8.75	19.18	14.08	7.15	23.66	15.9	0.0	0.0	12	3.90	1.64	141
07/08/2013	10.44	18.65	14.74	11.70	22.53	16.9	0.7	0.0	2	5.83	3.45	98
08/08/2013	9.28	14.65	11.98	9.59	18.52	14.1	0.0	0.0	1	5.91	3.72	194
09/08/2013	6.49	17.44	11.68	7.27	23.50	15.0	0.0	0.0	1	4.77	2.77	202
10/08/2013	7.60	20.54	14.04	9.13	26.10	17.0	0.0	0.0	1	3.37	2.23	184
11/08/2013	11.18	23.01	17.07	11.18	27.64	19.1	0.0	0.0	1	3.00	1.56	164
12/08/2013	15.24	23.65	19.69	12.27	27.84	19.8	0.0	0.0	1	3.80	1.50	132
13/08/2013	15.56	23.96	19.09	13.22	28.87	20.6	0.0	0.0	1	4.17	1.72	143
14/08/2013	11.05	21.58	16.30	12.48	26.65	18.3	0.0	0.0	0	2.54	1.49	189
15/08/2013	14.01	21.49	17.03	10.90	25.78	18.1	0.0	0.0	1	2.91	1.23	142
16/08/2013	11.28	18.57	14.48	11.40	23.95	17.0	0.0	0.0	1	3.31	2.01	186
17/08/2013	7.58	14.06	10.19	9.43	19.67	13.7	0.0	0.0	1	4.28	2.47	202
18/08/2013	6.33	13.85	8.90	6.82	19.68	11.6	5.1	0.4	3	3.40	2.17	204
19/08/2013	5.40	11.22	7.70	8.06	13.10	9.9	0.2	0.0	1	3.95	2.57	245
20/08/2013	4.06	13.70	8.75	4.54	16.90	10.7	0.0	0.0	2	4.39	3.05	221
21/08/2013	5.35	9.89	6.70	6.76	13.46	9.1	2.1	0.1	1	3.05	1.64	207
22/08/2013	4.27	12.99	7.35	5.98	16.99	9.8	1.8	0.2	2	4.25	1.85	198
23/08/2013	4.59	8.81	6.43	5.91	11.76	8.4	1.8	0.3	2	2.85	1.82	211
24/08/2013	4.01	7.78	5.67	6.12	10.22	7.7	1.5	0.3	2	2.93	1.55	233
25/08/2013	2.61	6.53	4.55	3.67	8.98	6.3	0.1	0.0	1	3.72	2.49	95
26/08/2013	4.66	8.78	6.22	5.91	11.13	7.9	0.0	0.0	1	3.09	1.30	174
27/08/2013	4.18	11.81	7.41	4.57	12.77	8.4	0.0	0.0	1	2.48	1.33	130
28/08/2013	5.19	15.48	9.86	2.37	17.20	9.7	0.0	0.0	1	3.73	1.96	143
29/08/2013	5.41	14.33	9.72	3.86	17.41	10.4	0.0	0.0	1	4.62	2.26	170
30/08/2013	5.06	16.70	10.84	3.68	21.05	11.9	0.0	0.0	1	3.45	1.75	183
31/08/2013	6.13	10.57	8.33	7.10	12.48	9.9	1.3	0.1	2	2.61	1.43	144
01/09/2013	4.04	8.12	5.58	5.98	10.95	7.8	2.5	0.4	2	2.99	1.44	137
02/09/2013	4.54	16.90	9.51	4.09	17.57	10.0	0.0	0.0	1	3.78	2.12	168
03/09/2013	7.53	12.16	9.47	6.86	12.60	9.0	0.0	0.0	1	6.88	3.81	201
04/09/2013	6.74	15.90	10.76	4.43	15.86	9.9	0.0	0.0	1	7.21	4.81	205
05/09/2013	4.98	13.74	8.71	4.62	15.43	9.5	0.0	0.0	1	3.98	2.31	205
06/09/2013	3.34	12.84	8.33	2.91	13.55	8.3	0.0	0.0	1	10.12	4.76	189
07/09/2013	8.78	14.17	11.21	7.15	15.68	11.1	0.0	0.0	1	7.25	5.08	179
08/09/2013	5.91	12.65	9.59	6.98	13.47	9.9	1.1	0.1	1	6.94	4.09	189
09/09/2013	2.44	10.95	6.58	1.92	14.14	7.7	0.0	0.0	1	4.14	2.79	220
10/09/2013	3.17	12.94	7.31	2.73	13.92	7.6	0.0	0.0	1	4.00	2.26	193
11/09/2013	4.90	13.45	8.73	5.89	13.69	8.9	0.2	0.0	1	9.02	4.46	171
12/09/2013	3.14	12.68	7.92	1.47	14.99	8.1	0.0	0.0	1	3.09	1.97	176
13/09/2013	2.46	12.37	7.37	1.52	14.48	7.6	0.0	0.0	1	3.02	1.81	201
14/09/2013	4.62	6.90	5.73	4.68	8.27	6.2	0.3	0.0	1	2.40	0.73	147
15/09/2013	4.11	7.15	5.38	4.93	8.00	6.2	0.0	0.0	1	4.83	2.55	126
16/09/2013	-1.25	4.76	1.73	0.33	5.10	2.5	1.9	0.3	5	5.93	2.67	119
17/09/2013	-1.30	4.88	1.38	0.14	6.25	2.5	2.6	0.2	1	3.99	1.68	109

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.	Mean	Max.	Max.	Mean	Mean
18/09/2013	0.93	7.11	3.61	0.02	8.28	3.7	0.1	0.0	1	5.24	2.66	187
19/09/2013	0.04	6.94	2.84	-1.12	7.69	2.9	0.5	0.0	1	4.62	2.57	137
20/09/2013	-2.04	1.16	-0.48	0.38	3.02	1.5	1.9	0.3	9	3.59	1.36	162
21/09/2013	-2.53	5.22	1.16	0.03	6.39	2.4	3.0	0.2	3	4.48	2.33	112
22/09/2013	-0.20	2.85	1.48	0.70	3.45	2.1	0.6	0.1	1	4.57	3.19	55
23/09/2013	-3.36	2.68	-0.15	-0.54	2.60	1.6	0.8	0.1	1	3.83	1.72	184
24/09/2013	-4.92	-1.85	-3.29	-1.61	0.75	-0.7	0.1	0.0	1	2.86	1.72	233
25/09/2013	-3.14	6.45	1.78	-2.30	4.05	0.8	0.1	0.0	1	4.43	2.24	140
26/09/2013	-0.63	3.07	0.98	0.19	1.08	0.7	1.2	0.3	4	4.40	2.27	210
27/09/2013	-2.65	5.17	1.52	-2.19	3.15	0.7	3.5	0.3	195	6.13	2.68	162
28/09/2013	0.01	3.29	1.07	-0.23	2.54	0.8	0.0	0.0	1	5.87	4.44	45
29/09/2013	0.64	4.18	1.52	0.49	3.53	1.4	0.0	0.0	0	6.86	5.12	35
30/09/2013	0.12	2.83	1.55	0.35	2.85	1.4	0.0	0.0	1	5.82	4.62	32

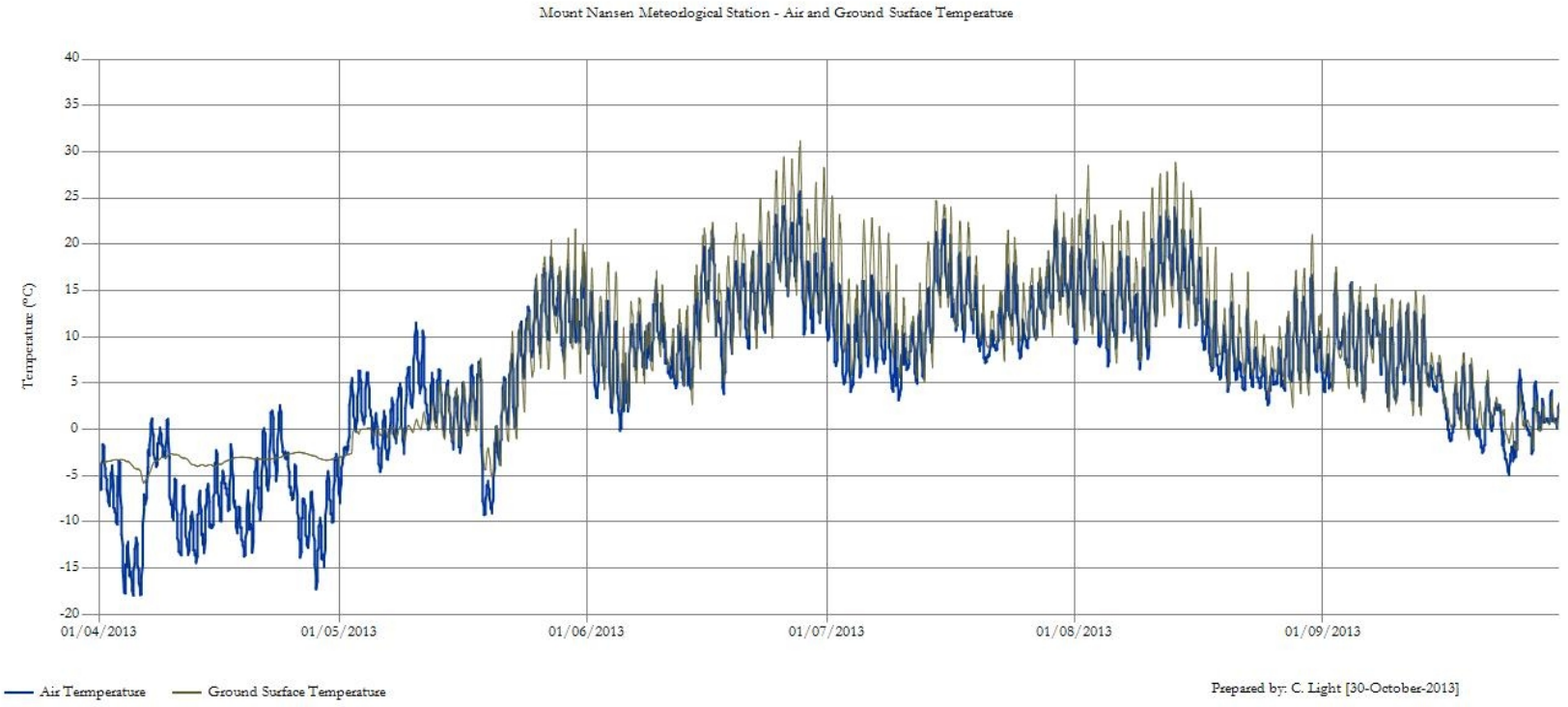

Figure F-1 Mount Nansen mean hourly air and ground temperature, April 1, 2013 to September 30, 2013.

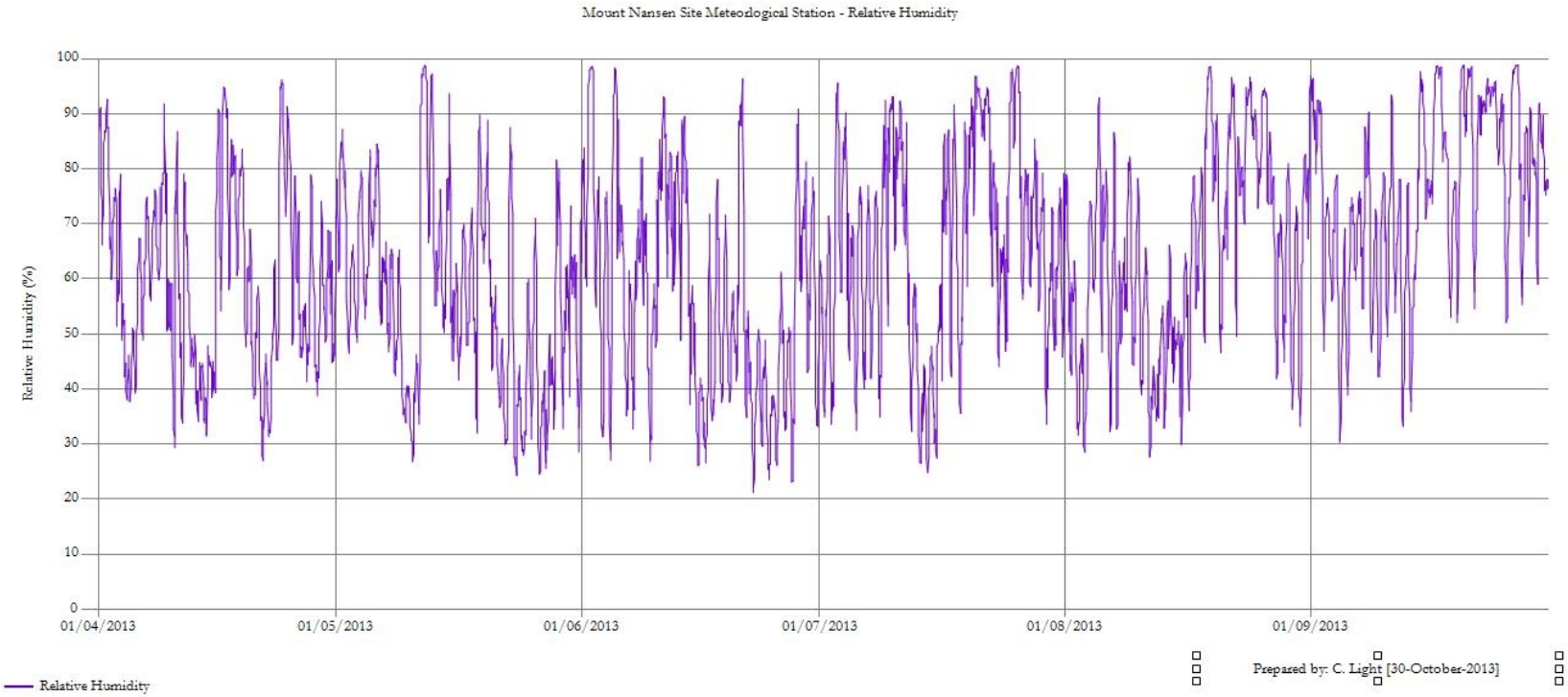

Figure F-2 Mount Nansen mean hourly relative humidity, April 1 to September 30, 2013.

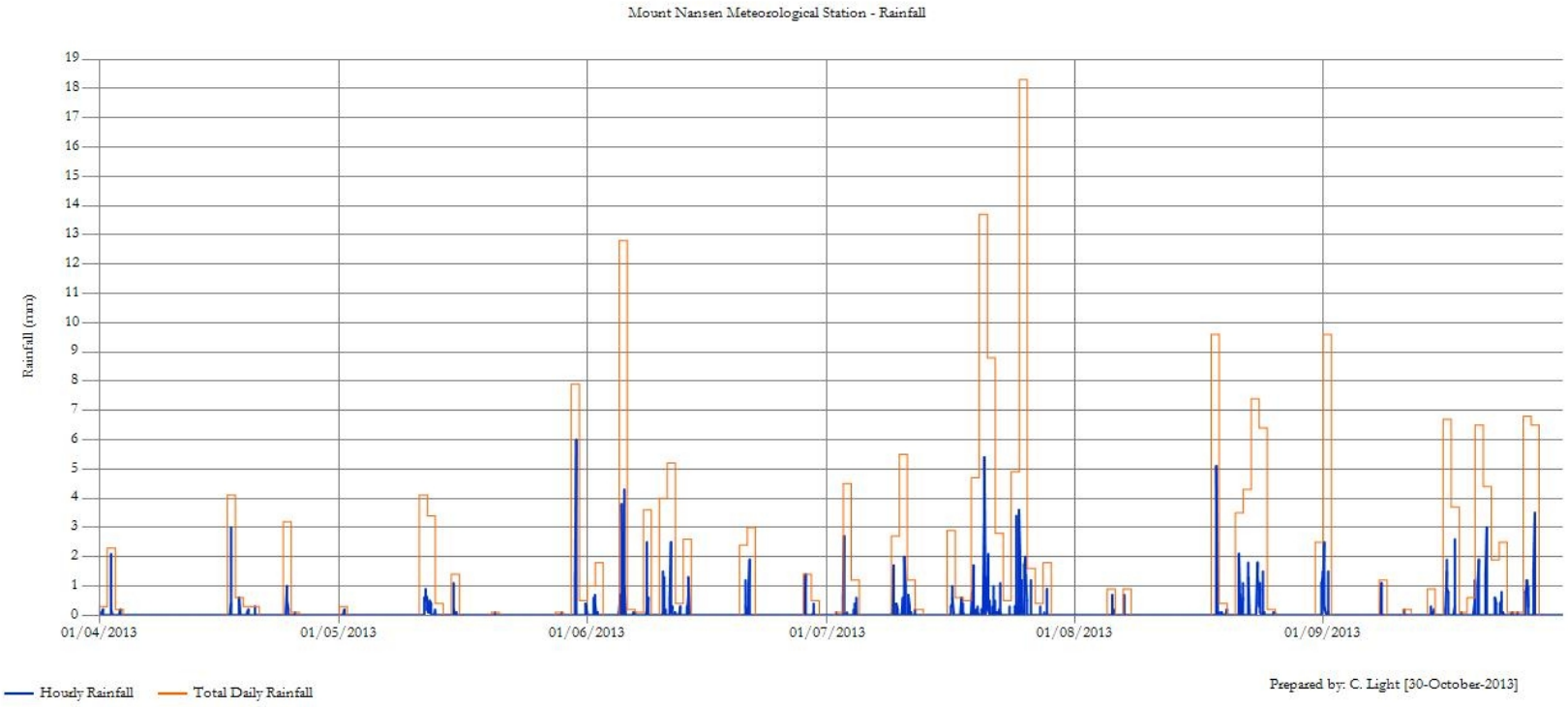

Figure F-3 Mount Nansen cumulative daily and hourly precipitation as rainfall, April 1 to September 30, 2013.

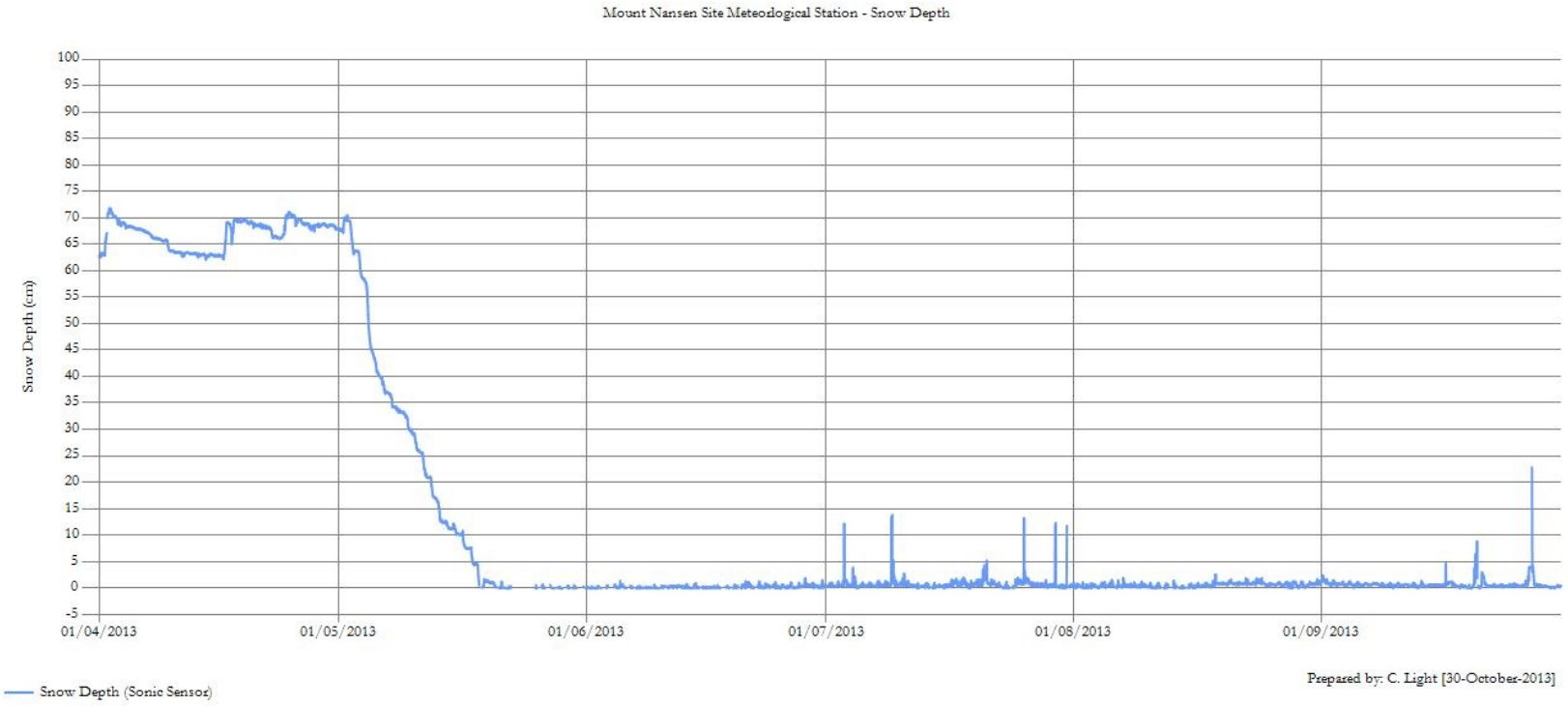

Figure F-4 Mount Nansen mean hourly snow depth, April 1 to September 30, 2013.

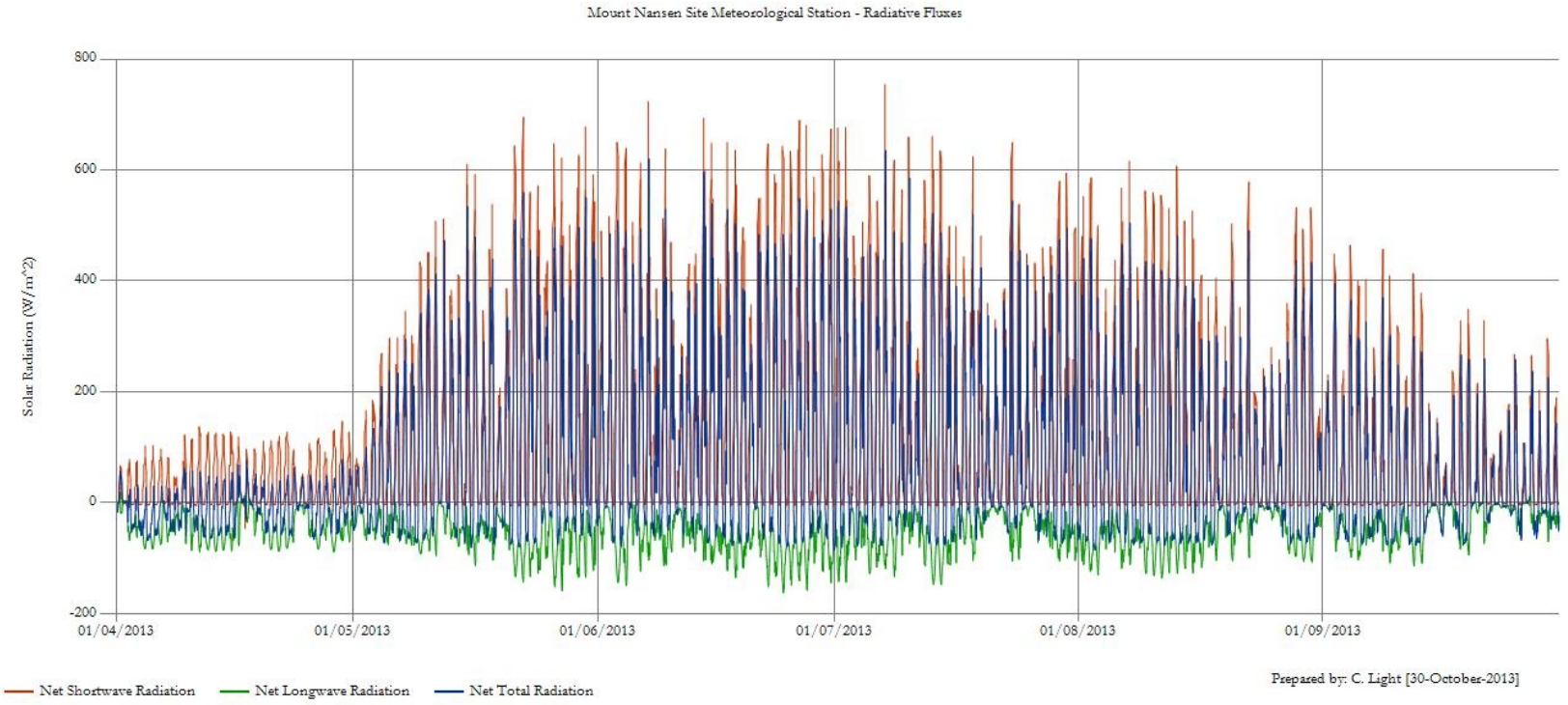

Figure F-5 Mount Nansen mean hourly net shortwave, long wave and total radiation, April 1 to September 30, 2013.

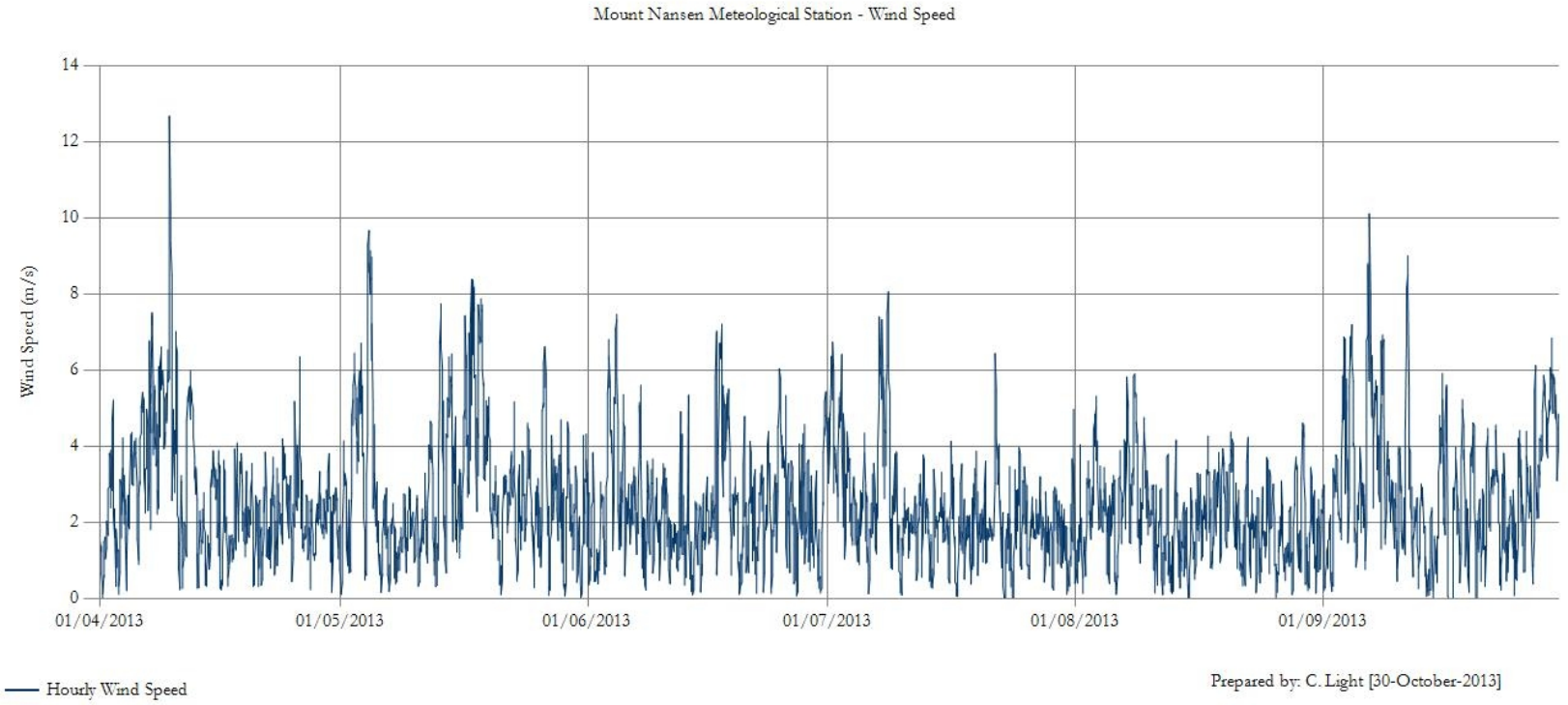

Figure F-6 Mount Nansen mean hourly wind speed, April 1 to September 30, 2013.

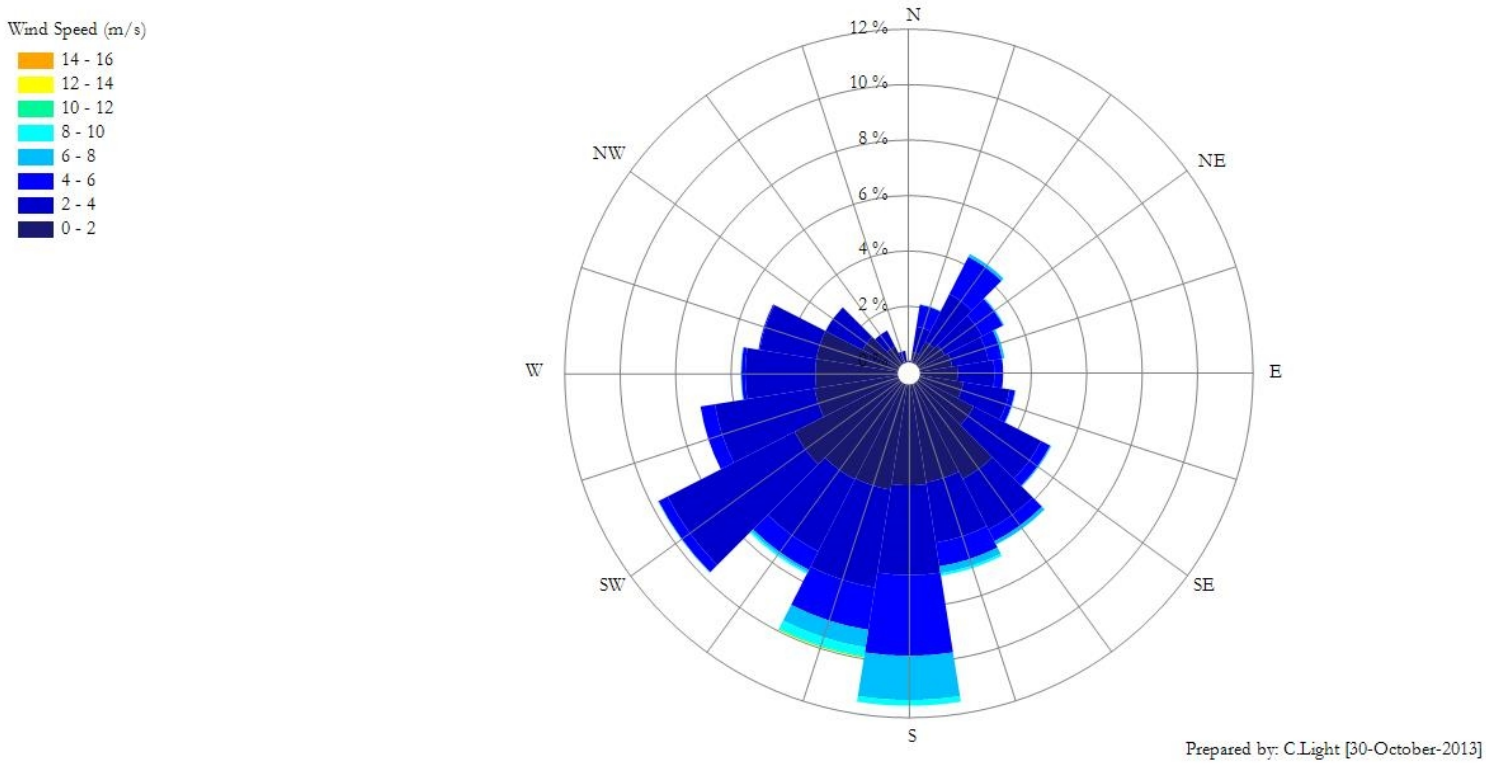

Figure F-7 Mount Nansen wind speed and direction, April 1 to September 30, 2013.