

**Faro Pelly River Aquatics Program
October 7-8, 2013 Field Report**



Prepared for:

Yukon

Energy Mines and Resources
Assessment and Abandoned Mines

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EXECUTIVE SUMMARY

Yukon Government, Assessment and Abandoned Mines retained EDI Environmental Dynamics Inc. to conduct the Faro Pelly River Aquatics Program in 2013. This program involves three sampling events: spring, summer and fall. This report presents the methods and results for the fall sampling event conducted October 7 to 8, 2013.

The Faro Pelly River Aquatics Program involves 22 monitoring stations at the Faro Mine Complex and surrounding area, including stations on the Pelly River, Van Gorder Creek (also known as Vangorda Creek), Rose Creek, Faro Creek, Anvil Creek, Dixon Creek, Reservoir Creek, and several unnamed watercourses. At each station in situ water quality measurements and samples for laboratory analysis were collected. In-situ measurements included water temperature, specific conductivity and pH. Samples were analyzed for routine parameters, nutrients, total and dissolved organic carbon, and total and dissolved metals. Quality Assurance/Quality Control samples were also collected, including two duplicate samples, one field blank and one travel blank.

Water levels and turbidity at the time of the fall sampling event had increased slightly from the August 2013 summer sampling event. Water temperatures, measured in the field, ranged from 0.0°C to 3.4°C. In-situ specific conductivity ranged from 31.8 µS/cm to 2,759.0 µS/cm and pH ranged from 6.20 to 8.21.

All samples were submitted to ALS Laboratories upon arrival in Whitehorse, YT. Laboratory analyses results were compared to both Canadian Council of Ministers of the Environment Aquatic Life Guidelines and the Faro Effluent Quality Standards. There were exceedances of several parameters, including total suspended solids, fluoride, aluminum, cadmium, copper, iron, lead, selenium, and zinc. All 22 of the stations had chemical exceedances. The NWID station had the highest number of exceedances. Exceedances are likely attributed in part to naturally high levels of mineralization in the area, while stations downstream of the influence of the mine may be under the effect of historical mining activity or ongoing care and maintenance activities associated with the Faro Mine Complex.



AUTHORSHIP

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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 surface water quality sampling for the 2013 Faro Pelly River Aquatics Program. This program involves three sampling events, including a spring, summer and fall sampling trip. This report presents the field report for the fall sampling event, conducted from October 7 to 8, 2013.

EDI conducted surface water quality sampling at 22 designated stations, which included sampling locations on the Pelly River, Anvil Creek, Rose Creek, Faro Creek, Dixon Creek, an unnamed creek draining the Grum ore transfer pad, and Van Gorder Creek (Table 1; Figure 1). Please note Van Gorder Creek will be referred to by its alternate name throughout this report, 'Vangorda Creek', as that is the name used by AAM for the Faro Mine Complex and Faro Mine Remediation Project, while Van Gorder Creek remains the official geographic name (Yukon Government Tourism and Culture 2010).

Of the 22 sampling locations, 13 are classified as receiving environment stations, seven are reference stations, and two are sampled for other purposes (Table 1). At each station, samples were collected and in-situ water quality parameters were measured, including water temperature, specific conductivity and pH. All samples were sent to an accredited laboratory for analysis of routine, organic carbon, metal and nutrient parameters. Quality Assurance/Quality Control (QA/QC) samples were also collected during the fall field visit, including duplicate samples, a field blank and a travel blank.

During the October trip, water levels and turbidity were moderate and slightly higher than the previous trip in August. Water temperatures had also decreased from the previous trip.

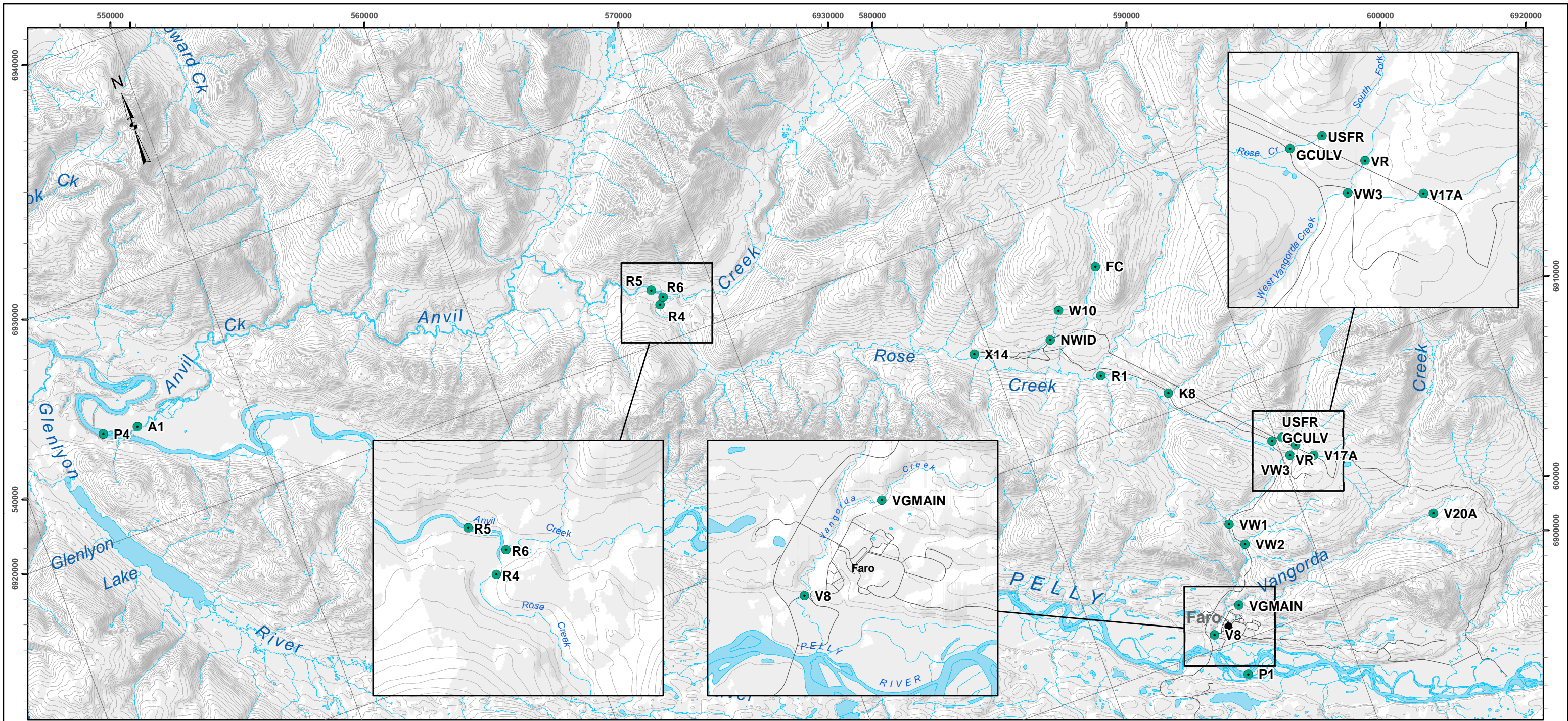


Faro Pelly River Aquatics Program: October 7-8, 2013 Field Report

Table 1. Summary of 2013 Faro Pelly River Aquatics Program surface water quality station locations, October 2013.

Station Name	UTM Coordinates ⁽¹⁾		Location Description	Station Purpose
	Easting	Northing		
A1	545359	6924220	Anvil Creek near the confluence with Pelly River	Receiving
FC	585362	6916780	Faro Creek above diversion channel	Reference
GCULV	589818	6907388	South Fork Rose Creek d/s Haul Road and u/s Mine Access Road	Other
K8	586420	6910759	Reservoir Creek u/s Mine Access Road	Other
NWID	582536	6914552	Northwest interceptor ditch u/s of diversion point	Receiving
P1	585548	6898568	Pelly River u/s of Vangorda Creek ⁽²⁾	Reference
P4	543912	6924417	Pelly River d/s of Anvil Creek	Receiving
R1	584012	6912410	South Fork Rose Creek u/s pump house pond and tailings system	Reference
R4	567680	6921520	Rose Creek u/s confluence with Anvil Creek	Receiving
R5	567540	6922219	Anvil Creek u/s of Rose Creek after full mixing	Receiving
R6	567908	6921780	Anvil Creek u/s of Rose Creek	Receiving
USFR	590268	6907403	South Fork Rose Creek u/s Haul Road	Reference
V17A	591259	6906240	Creek from Grum ore transfer pad	Receiving
V20A	595137	6902240	Dixon Creek u/s of mine workings, tributary of Vangorda Creek	Reference
V8	584785	6900600	Lower Vangorda Creek at the footbridge	Receiving
VGMAIN	586163	6901427	Main Fork Vangorda Creek d/s of mine but u/s of West Vangorda Creek	Receiving
VR	590688	6906910	West Fork of Vangorda Creek u/s of Haul Road	Reference
VW1	586930	6904733	West Fork of Vangorda Creek d/s of landslide but u/s of VW2	Receiving
VW2	587281	6903723	Tributary to West Vangorda Creek which drains Grum west lobe	Receiving
VW3	590329	6906589	West Fork of Vangorda Creek d/s of AEX Creek	Receiving
W10	583280	6915590	Upper Guardhouse Creek u/s NW Dump	Reference
X14	579340	6915080	Rose Creek d/s of the diversion channel	Receiving

Notes: ⁽¹⁾ UTM coordinates in NAD 83 datum, Zone 8V. ⁽²⁾ Vangorda Creek is officially known as Van Gorder Creek, which is the geographic name; however, for the purposes of this report the name has been left as Vangorda, as that is the name used by AAM across the Faro Mine Complex.



Faro Pelly River Aquatics Program Surface Water Sampling Locations

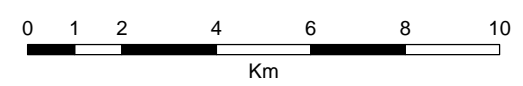
- Legend**
- Water Quality Monitoring Station
 - Robert Campbell Highway
 - Access Road

1:250,000 topographic spatial data: Canvec and National Topographic Database (NTDB); courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

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

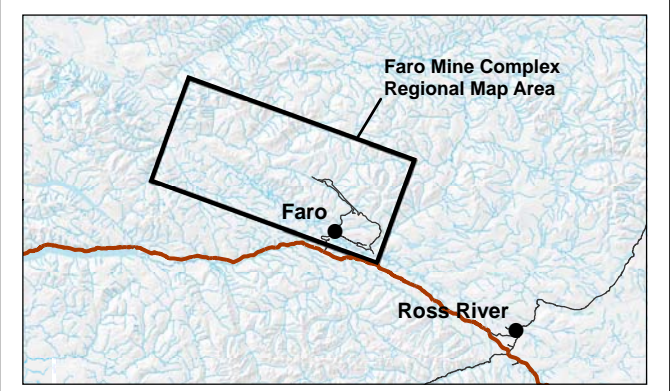
Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2013) was obtained using Garmin GPS technology.

Van Gorder Creek will be referred to by its alternate name throughout this report, 'Vangorda Creek', as that is the name used by AAM for the Faro Mine Complex and Faro Mine Remediation Project, while Van Gorder Creek remains the official geographic name (Yukon Government Tourism and Culture 2010).



Map Scale = 1:160,000 (printed on 11 x 17)
Map Projection: North American Datum 1983 UTM Zone 8N

Drawn: MP	Checked: MM	Overview	Date: 12/02/2014
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2 METHODOLOGY

Two EDI field crew members conducted the fall surface water quality program from October 7 to 8, 2013 at the Faro Mine Complex and surrounding area. Several stations were accessed by helicopter, including P1, P4, A1, R4, R5, R6, and V20A. The remaining stations were accessed by vehicle with a relatively short walk on foot to the sampling location. The following sections provide details on field methodology, laboratory analysis, QA/QC program, and data analysis conducted for this program.

2.1 FIELD METHODOLOGY

Water samples were collected at each site for laboratory analysis, along with in situ field data, photo documentation, and geographic coordinates. A YSI ProPlus was used collect in-situ field parameters, including water temperature, pH, and specific conductivity. Field crews calibrated the meter on a daily basis prior to field sampling. Field data was recorded on standard field datasheets, which included 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 standard techniques (i.e. nitrile gloves, appropriate bottle handling) and samples were field filtered and preserved, as directed by the lab. Samples were kept in coolers with ice packs during the field work and transport, and were stored in a refrigerator overnight. 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.

2.2 LABORATORY ANALYSIS

All surface water quality laboratory analyses were conducted by ALS. Parameters analyzed included general routine, organics, nutrients, and metals. A complete list of parameters is included below in Table 2 with minimum and preferred method detection limits.

Analytical data generated by ALS was provided in an electronic data deliverable format specific to the project, as outlined in the Faro Pelly River Aquatics Program Agreement document (No. C00017770).



Table 2. List of parameters selected for laboratory analysis for the Faro Pelly River Aquatics Program.

Parameters for Laboratory Analysis	Units	Minimum Detection Limit	Preferred Detection Limit
Miscellaneous Routine Parameters			
Alkalinity	mg/L	1	1
Ammonia – N	mg/L	0.05	0.02
Chloride	mg/L	1	0.05
Dissolved solids, total (TDS)	mg/L	10	10
Nitrate – N	mg/L	0.1	0.03
Organic carbon, dissolved (DOC)	mg/L	1	0.1
Organic carbon, total (TOC)	mg/L	1	0.1
Phosphorus, total	mg/L	0.005	0.002
pH	pH Units	0.01	0.01
Sulphate	mg/L	1	0.2
Suspended solids, total (TSS)	mg/L	2	1
ICP – Metals Scan (Total and Dissolved)			
Aluminum (Al)	mg/L	0.005	0.001
Antimony (Sb)	mg/L	0.005	0.001
Arsenic (As)	mg/L	0.001	0.0005
Barium (Ba)	mg/L	0.01	0.001
Beryllium (Be)	mg/L	0.001	0.001
Bismuth (Bi)	mg/L	0.002	0.001
Boron (B)	mg/L	0.05	0.001
Cadmium (Cd)	mg/L	0.00001	0.000005
Calcium (Ca)	mg/L	0.5	0.05
Chromium (Cr)	mg/L	0.001	0.0002
Cobalt (Co)	mg/L	0.0009	0.00005
Copper (Cu)	mg/L	0.001	0.0001
Iron (Fe)	mg/L	0.05	0.005
Lead (Pb)	mg/L	0.001	0.0002
Magnesium (Mg)	mg/L	0.5	0.05
Manganese (Mn)	mg/L	0.002	0.0005
Molybdenum (Mo)	mg/L	0.001	0.001
Nickel (Ni)	mg/L	0.002	0.001
Potassium (K)	mg/L	0.5	0.05
Selenium (Se)	mg/L	0.001	0.0002
Silver (Ag)	mg/L	0.00005	0.00001
Sodium (Na)	mg/L	0.5	0.05
Strontium (Sr)	mg/L	0.002	0.001
Thallium (Tl)	mg/L	0.0003	0.00005

Table continued on next page.



Table 2. Continued.

Parameters for Laboratory Analysis	Units	Minimum Detection Limit	Preferred Detection Limit
Tin (Sn)	mg/L	0.001	0.001
Titanium (Ti)	mg/L	0.005	0.005
Uranium (U)	mg/L	0.005	0.0001
Vanadium (V)	mg/L	0.006	0.001
Zinc (Zn)	mg/L	0.005	0.0005
Zirconium (Zr)	mg/L	0.004	0.001

2.3 QA/QC PROGRAM

Several QA/QC measures were employed during the fall 2013 sampling visit, including two duplicate samples, a field blank sample and a trip blank sample, explained 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 (X14 and P1), randomly selected on the October 2013 trip. The duplicate samples were conducted to check the accuracy and precision of the laboratory analysis as well as identify environmental variability.
- 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 (e.g., filter, syringe, bottle, or preservative).
- The travel blank was a sample set provided by the laboratory to be carried by the field crew 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 according to the *British Columbia Field Sampling Manual* (Clark 2003). Field and travel blank sample data was reviewed to ensure that concentrations of all potential contaminants were low to below detection limits. Duplicate samples were used to calculate relative percent difference (RPD) to express precision of a sample and its duplicate, see formula below:

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



Where duplicate results were less than 5-times the detection limit, the difference between the sample and the duplicate should be no greater than 2-times the detection limit to be considered precise. If the difference between the sample and duplicate are greater than 2-times the detection limit, the RPD value must be reported. For analytical results greater than 5-times the detection limit, RPD values less than 20% are considered precise. RPD values greater than 50% indicate problems or errors that affect precision of the analytical result. See Table 3 for a summary of how QA/QC results are assessed.

Table 3. QA/QC assessment categories and results

Category	QA/QC Result
<DL	Adequately Precise
<2XDL	Adequately Precise
RPD<20%	Adequately Precise
RPD>20%	Imprecise or Intrinsically High Variability
RPD>50%	Error or Problem

Where, DL = detection limit and RPD = relative percent difference.

2.4 DATA ANALYSIS

For the purpose of this report, data were reviewed and parameters of concern were summarized 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 4), and with the Effluent Quality Standards (EQS) for the Faro Mine Complex (Table 5).

Table 4. List of applicable CCME guidelines for Aquatic Life.

Water Quality Parameter	CCME AL Guideline	Comments
Aluminum	0.1 mg/L	CCME is 0.1 at pH > 6.5, if pH is lower than 6.5, guideline is set at 0.005 mg/L
Ammonia	0.75 mg/L	Guideline is temperature and pH dependent. This represents a highly conservative guideline calculated for a pH of 8.5 and a water temperature of 0°C. Guideline decreases with increasing pH and temperature.
Arsenic	0.005 mg/L	-
Cadmium	0.000033 mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L. A hardness dependent guideline was calculated based on the following equation: Hardness Adjusted Guideline = $10^{0.86(\log[\text{hardness}]-3.2)/1000}$
Chloride	120 mg/L	-
Chromium	0.0089 mg/L	-

Table continued on next page.

Where, '-' indicates no comment on this specific parameter.



Table 4. Continued.

Water Quality Parameter	CCME AL Guideline	Comments
Copper	0.002 mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L. A hardness dependent guideline was calculated based on the following equation: Hardness Adjusted Guideline = $e^{0.8545 (\text{LN}[\text{hardness}]-1.465)*0.2}$
Fluoride	0.120 mg/L	-
Iron	0.3 mg/L	-
Lead	0.003 mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L. A hardness dependent guideline was calculated based on the following equation: Hardness Adjusted Guideline = $e^{1.273 (\text{LN}[\text{hardness}]-4.705)/1000}$
Molybdenum	0.0073 mg/L	-
Nickel	0.1 mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L. A hardness dependent guideline was calculated based on the following equation: Hardness Adjusted Guideline = $e^{0.76 (\text{LN}[\text{hardness}]+1.06)/1000}$
Nitrate	13 mg/L	-
Nitrite	0.06 mg/L	-
pH	6.5 - 9.0	-
Selenium	0.001 mg/L	-
Silver	0.0001 mg/L	-
Thallium	0.0008 mg/L	-
Uranium	0.015 mg/L	-
Zinc	0.03 mg/L	-

Where, '-' indicates no comment on this specific parameter.



Table 5. Applicable Faro EQS for the Faro Mine Complex.

Water Quality Parameter	Effluent Quality Standard
Total Suspended Solids	≤ 15 mg/L
pH	≥ 6.5 pH units
Ammonia (as N)	≤ 1.4 mg/L
Antimony	≤ 0.1 mg/L
Arsenic	≤ 0.05 mg/L
Barium	≤ 1 mg/L
Cadmium	≤ 0.02 mg/L
Copper	≤ 0.2 mg/L
Lead	≤ 0.2 mg/L
Molybdenum	≤ 0.5 mg/L
Nickel	≤ 0.5 mg/L
Selenium	≤ 0.05 mg/L
Silver	≤ 0.1 mg/L
Zinc	≤ 0.5 mg/L



3 RESULTS

3.1 FIELD AND LAB ANALYSIS RESULTS

Observed water levels were low to moderate during the October 7 to 8, 2013 sampling event, with clear to low turbidity at most stations. Water level and turbidity at some stations had increased slightly from the August 2013 sampling event. Water temperatures ranged from 0.0°C to 3.4°C (Table 7). In-situ specific conductivity ranged from 31.8 µS/cm to 2,759.0 µS/cm and pH ranged from 6.20 to 8.21 (Table 7). Copies of the field datasheets are provided in Appendix B.

Samples were delivered to ALS on October 8, 2013. Laboratory analysis results for the surface water samples were compared to both CCME Aquatic Life Guidelines (CCME 2013) and the Faro EQS. Total suspended solids (TSS) exceeded the Faro EQS at three stations: VW1, V20A, and NWID.

Several stations exceeded CCME guidelines for aluminum (Al), cadmium (Cd), copper (Cu), fluoride (F), iron (Fe), lead (Pb), selenium (Se), and zinc (Zn). The Zn standards for CCME and EQS were both exceeded at the NWID station, as was also the case in August 2013. Several of these parameters are hardness dependent (e.g., Cd, Cu, Pb) and guideline values for these parameters were adjusted based on hardness levels. A summary of stations with CCME and/or Faro EQS exceedances is provided in Table 6. All lab analysis results are detailed in Appendix C with exceedances highlighted. The Lab Certificate of Analysis is provided in Appendix E.

All 22 sampling stations had guideline and/or standard exceedances during the October 2013 sampling event. The NWID station had the highest number of exceedances, followed by stations FC, VW1, VW2, P1 and P4 (Table 6). These six sites are the only sites where the Cd CCME guideline was exceeded during the October sampling event. The NWID station had the highest concentrations of Cd, Cu, Fe and Zn; whereas, station VW1 had the highest concentrations of F and Al. Station V20A had the highest concentration of TSS, station FC had the highest concentration of Pb, and station VW2 had the highest concentration of Se (Appendix C).

The number of stations with guideline and standard exceedances in October 2013 had increased compared to August 2013, when seven stations had no chemical exceedances. In October 2013, the number of stations with exceedances in Al, Fe and Se increased, most notably for Al exceedances in all 22 stations versus only five stations with Al exceedances in August. Conversely, the number of stations with exceedances in Cd, Cu and Pb decreased from August to October 2013, most notably there were only six stations with Cd exceedances in October 2013, versus twelve stations with Cd exceedances in August 2013.

Station V20A had the largest increase in the number of exceedances, from only F in August 2013 to TSS, F, Al and Fe in October 2013; while, station A1 had the largest decrease in the number of exceedances, from TSS, Al, Cd, Cu and Fe in August 2013 to only Al and Fe in October 2013.



Both Pelly River stations P1 and P4 (reference site) had exceedances for F, Al, Cd and Se. Several of the reference stations had exceedances likely attributed to the mineralization in the local area (e.g., stations FC, P1, V20A, VR, and W10). Exceedances at several of the receiving environment stations may be attributed to naturally high levels of mineralization in combination with historical mining and/or ongoing care and maintenance activities associated with the Faro Mine Complex.



Table 6. Summary of CCME Guideline and Faro EQS exceedances, October 2013.

Type	Station ID	Guideline/Standard Exceedances									
		TSS	F	Al	Cd	Cr	Cu	Fe	Pb	Se	Zn
Reference Stations	USFR	-	-	X	-	-	-	-	-	-	-
	FC	-	-	X	X	-	X	-	X	-	-
	W10	-	-	X	-	-	-	-	-	-	-
	P1	-	X	X	X	-	-	-	-	X	-
	V20A	*	X	X	-	-	-	X	-	-	-
	R1	-	-	X	-	-	-	-	-	-	-
	VR	-	-	X	-	-	-	-	-	-	-
Receiving Environment Stations	A1	-	-	X	-	-	-	X	-	-	-
	R4	-	-	X	-	-	-	-	-	-	-
	R5	-	-	X	-	-	-	-	-	-	-
	R6	-	-	X	-	-	-	-	-	-	-
	V17A	-	-	X	-	-	-	X	-	-	-
	P4	-	X	X	X	-	-	-	-	X	-
	V8	-	X	X	-	-	-	X	-	-	-
	VGMAIN	-	-	X	-	-	-	-	-	-	-
	X14	-	-	X	-	-	-	X	-	-	X
	NWID	*	-	X	X	-	X	X	-	-	X*
	VW1	*	X	X	X	-	-	X	-	-	-
	VW2	-	X	X	X	-	-	X	-	X	-
VW3	-	-	X	-	-	-	-	-	-	-	
Other	GCULV	-	-	X	-	-	-	-	-	-	-
	K8	-	-	X	-	-	-	-	-	-	-

Where, '-' indicates no exceedance, 'X' indicates a CCME guideline exceedance, and * indicates a Faro EQS exceedance.



Table 7. Summary of in-situ water quality and site conditions, October 2013.

Type	Station ID	Sample Date (yy-mmm-dd)	Time (hh:mm)	Water Temp (°C)	SPC (µS/cm)	pH	Site Conditions
Reference Stations	P1	13-Oct-08	11:16	2.8	312.9	8.02	Water level low, turbidity low
	FC	13-Oct-07	13:48	1.2	31.8	6.20	Water level mod., clear water, ice at margins
	USFR	13-Oct-07	13:22	1.0	54.3	6.41	Water level moderate, clear water
	VR	13-Oct-07	13:07	1.4	61.0	6.31	Water level moderate, clear water
	V20A	13-Oct-08	10:51	1.7	406.1	7.12	Water level low, turbidity low, <1cm ice, orange
	R1	13-Oct-07	15:20	1.6	199.4	7.67	Water level moderate, clear water
	W10	13-Oct-07	14:15	1.8	105.3	6.87	Water level high, clear water, snow on ground
Receiving Environment Stations	A1	13-Oct-08	9:19	0.5	260.3	7.56	Water levels low, turbidity low
	R4	13-Oct-08	10:07	0.0	272.5	7.67	Water level mod., turbidity low, ice at margins
	R5	13-Oct-08	9:46	0.0	276.0	7.58	Water levels low/moderate, turbidity low
	R6	13-Oct-08	10:06	0.1	279.2	7.79	Water levels mod., turbidity low, iced at margins
	P4	13-Oct-08	9:00	3.1	338.7	7.61	Water levels low, water clear to low turbidity
	V17A	13-Oct-07	12:48	1.4	160.6	6.69	Water level low, clear water, ice at margins
	NWID	13-Oct-07	14:34	3.4	2,759.0	7.20	Water level moderate, turbidity low
	V8	13-Oct-07	17:34	2.0	414.0	8.15	Water level high, turbidity moderate
	VGMAIN	13-Oct-07	17:57	2.0	372.1	8.05	Water level moderate, clear water
	X14	13-Oct-07	14:52	1.3	279.4	7.62	Water level moderate, turbidity low
	VW1	13-Oct-07	16:55	1.6	321.3	7.96	Water levels high, turbidity high
	VW2	13-Oct-07	17:16	1.4	651.7	8.21	Water levels high, clear water, ice at margins
	VW3	13-Oct-07	16:13	1.8	154.0	7.33	Water level moderate, clear water
Other	GCULV	13-Oct-07	16:03	1.9	58.0	7.20	Water level moderate, turbidity low
	K8	13-Oct-07	15:42	1.1	99.9	7.43	Water level moderate, turbidity low



3.2 QA/QC RESULTS

Duplicate samples were collected at stations X14 and P1. Results were analyzed as outlined in Section 2.4, according to the *British Columbia Field Sampling Manual* (Clark 2003). A table of the results is provided in Appendix D.

Results are either categorized as less than detection limit (<DL), less than twice the detection limit (<2XDL) or relative percent difference (RPD). Overall average RPD for each set of duplicate QA/QC samples was 6.4% for the X14 sample and duplicate and 0.5% for the P1 sample and duplicate. The P1 sample set was considered adequately precise. The X14 set was adequately precise for all parameters, except dissolved Aluminum (28.9%) and dissolved Lead (-120.0%). The values greater than 20% RPD suggests that the data is imprecise or that there is intrinsically high variability, while the RPD value over 50% suggests an error or problem in the lab analysis results.

Travel blank and field blank results were all within acceptable levels. There were no indications of contamination from sample handling or transportation (Appendix C).



4 RECOMMENDATIONS

Sampling was conducted successfully during the Faro Pelly River Aquatics Program fall 2013 sampling event. This represents the last trip of the 2013 Program. It is recommended that monitoring continue, as many results exceeded guideline and/or standard values and metal concentrations have fluctuated during the course of the 2013 program. The program would benefit from a multi-year analysis to determine if there are any trends in the results.



5 REFERENCES

- Canadian Council Ministers of the Environment (CCME). Canadian Environmental Quality Guidelines Summary Table. <http://st-ts.ccme.ca/>, accessed October 2013.
- Clark, M.J.R. (editor). 2003. British Columbia Field Sampling Manual. Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Victoria, BC, Canada. 312 pp.
- Yukon Government Tourism and Culture. 2010. Gazetteer of Yukon. Geographic Names Program, Heritage Resources Unit, Cultural Services Branch, May 2010. 74 pp.

5.1 SPATIAL DATA

- 1:250,000 CanVec topographic data from Government of Canada, Natural Resources Canada, Earth Sciences Sector, Centre for Topographic Information. Geogratis website <http://geogratis.cgdi.gc.ca>
- Yukon Government – Geomatics. Digital Elevation Model. Corporate Spatial Warehouse. Accessed from www.geomaticsyukon.ca

Disclaimer:

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

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**APPENDIX A SITE PHOTOGRAPHS,
OCTOBER 7-8, 2013**

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Vangorda Creek Watershed Stations



Photo 1. West Fork Vangorda Creek upstream of Haul Road (**VR**), looking downstream to Haul Road culvert.



Photo 2. Vangorda Creek tributary from Grum ore transfer pad (**V17A**), looking upstream from Haul Road culvert.



Photo 3. West Fork Vangorda Creek upstream of VW2 Tributary (**VW1**), looking upstream.



Photo 4. West Fork Vangorda Creek tributary which drains Grum west lobe (**VW2**), looking upstream from Mine Access Road culvert.



Vangorda Creek Watershed Stations (continued)



Photo 5. West Fork Vangorda Creek downstream of AEX Creek (**VW3**), looking upstream to auxiliary road culvert.



Photo 6. Main Fork Vangorda Creek downstream of mine but upstream of West Vangorda Creek confluence (**VGMAIN**), looking upstream from footbridge.



Photo 7. Lower Vangorda Creek downstream of confluence of West Vangorda Creek and Main Fork Vangorda Creek (**V8**), looking upstream from bridge.



Photo 8. Dixon Creek upstream of mine, tributary of Vangorda Creek (**V20A**), looking downstream.



Rose Creek Watershed Stations



Photo 9. South Fork of Rose Creek upstream of pumphouse pond and tailings system (**R1**), looking downstream from sampling location.



Photo 10. Rose Creek upstream of confluence with Anvil Creek (**R4**), looking upstream (sampling location on left side of photo).



Photo 11. South Fork Rose Creek upstream of Haul Road (**USFR**), looking upstream from sampling location.



Photo 12. South Fork Rose Creek downstream of Haul Road but upstream of Mine Access Road (**GCULV**), looking upstream from culvert.



Rose Creek Watershed Stations, including Faro Creek,
Guardhouse Creek and the Northwest Interceptor Ditch.



Photo 13. Rose Creek downstream of diversion channel (**X14**), looking downstream from sampling location.



Photo 14. Faro Creek above diversion channel (**FC**), looking downstream from sampling location.



Photo 15. Upper Guardhouse Creek upstream of NW Dump (**W10**), looking downstream from sampling location.



Photo 16. Northwest interceptor ditch upstream of diversion point (**NWID**), looking upstream from sampling location.



Anvil Creek Stations & Reservoir Creek Station



Photo 17. Anvil Creek upstream from confluence with Pelly River (**A1**), looking downstream from sampling location.



Photo 18. Anvil Creek downstream of confluence with Rose Creek (**R5**), looking upstream from sampling location.



Photo 19. Anvil Creek upstream of confluence with Rose Creek (**R6**), view looking downstream from sampling location towards mouth of Rose Creek.



Photo 20. Reservoir Creek upstream of Mine Access Road (**K8**), view looking upstream of culvert from sampling location.



Pelly River Stations



No photo from **P1** sampling location on Pelly River upstream of the Vangorda Creek confluence for October 2013 sampling event.

Photo 21. Overview of sampling location (**P4**) on the Pelly River, downstream of the Anvil Creek confluence.



**APPENDIX B EDI FIELD DATA SHEETS,
OCTOBER 7-8, 2013**

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Project No.: 13-Y-0199

Weather: partly cloudy
0°C

Field Samplers: MM
LW

Project Name: Faro Surface Water Quality

Page 1 of 6

YSI Calibration Performed? Yes / No

Date / Time: Oct 7, 11:30 am

Site Information		Site Information	
Site Name:	<u>V-17A</u>	Site Name:	<u>VR</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct. 7 @ 12:48pm</u>	Sample Date and Time:	<u>Oct 7 @ 13:07</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.4°C</u>	Temperature:	<u>1.4°C</u>
Specific Conductivity (SPC):	<u>160.6</u>	Specific Conductivity (SPC):	<u>61.0</u>
pH:	<u>6.69</u>	pH:	<u>6.31</u>
Site Conditions		Site Conditions	
flow level:	<u>low</u>	flow level:	<u>moderate</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>clear</u>
ice thickness (if applicable)	<u>edges</u>	ice thickness (if applicable)	<u>none</u>
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: <u>8110</u>	Datasheet:	Downstream: <u>8112</u>
Upstream: <u>8111</u>	Overview: <u>8109</u>	Upstream: <u>8113</u>	Overview:

Site Information		Site Information	
Site Name:	<u>USFR</u>	Site Name:	<u>FC</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 7 1322</u>	Sample Date and Time:	<u>Oct 7 1348</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.0°C</u>	Temperature:	<u>1.2</u>
Specific Conductivity (SPC):	<u>54.3</u>	Specific Conductivity (SPC):	<u>31.8</u>
pH:	<u>6.41</u>	pH:	<u>6.70</u>
Site Conditions		Site Conditions	
flow level:	<u>mod</u>	flow level:	<u>mod</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>clear</u>
ice thickness (if applicable)	<u>na</u>	ice thickness (if applicable)	<u>some on margins</u>
Notes		Notes	
(if pit incl. DO and ice thickness) <u>ice on margins + around rocks.</u>		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: <u>8116</u>	Datasheet:	Downstream: <u>8121</u>
Upstream: <u>8117</u>	Overview: <u>8119</u>	Upstream: <u>8120</u>	Overview: <u>8119</u>

Field Blank ID _____
Trip Blank ID _____





Project No.: 13-Y-0167

Weather: overcast, calm
0°C → 4.5°C

Field Samplers: MM, LLW

Project Name: Mount Nansen Water Quality

Page 2 of 6

YSI Calibration Performed? Yes / No

Date / Time: 11:30 Oct 7

Site Information		Site Information	
Site Name:	<u>W10</u>	Site Name:	<u>MW10</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 7, 2013 14:15</u>	Sample Date and Time:	<u>Oct 7, 2013 14:15</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>7.8</u>	Temperature:	<u>3.4</u>
Specific Conductivity (SPC):	<u>105.3</u>	Specific Conductivity (SPC):	<u>2759</u>
pH:	<u>6.87</u>	pH:	<u>7.21</u>
		Turbidity:	
Site Conditions		Site Conditions	
flow level:	<u>high</u>	flow level:	<u>mod</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)	<u>none</u>	ice thickness (if applicable)	<u>none</u>
Notes		Notes	
(if pit incl. DO and ice thickness)	<u>snow on ground</u>	(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8122</u>	Downstream:	<u>8125</u>
Upstream:	<u>8124</u>	Overview:	
		Datasheet:	<u>8126</u>
		Downstream:	<u>8128</u>
		Upstream:	<u>8127</u>
		Overview:	

Site Information		Site Information	
Site Name:	<u>X14</u>	Site Name:	<u>R1</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 7, 2013 14:52</u>	Sample Date and Time:	<u>Oct 7, 2013 15:20</u>
Replicate ID (if applicable)	<u>Duplicate #1 14:52</u>	Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.3</u>	Temperature:	<u>6.6</u>
Specific Conductivity (SPC):	<u>279.4</u>	Specific Conductivity (SPC):	<u>199.4</u>
pH:	<u>7.62</u>	pH:	<u>7.67</u>
		Turbidity:	
Site Conditions		Site Conditions	
flow level:		flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8129</u>	Downstream:	<u>8130</u>
Upstream:	<u>8131</u>	Overview:	
		Datasheet:	<u>8135</u>
		Downstream:	<u>8134</u>
		Upstream:	<u>8132</u>
		Overview:	<u>8133</u>

Field Blank ID _____

Trip Blank ID _____



Project No.: 13-Y-0199

Weather: light breeze
4°C cloudy

Field Samplers: MM, LW

Project Name: Faro Surface Water Quality

Page 3 of 10

YSI Calibration Performed? Yes / No

Date / Time: 11:30 Oct 7, 2013

Site Information		Site Information	
Site Name:	<u>K8</u>	Site Name:	<u>6 CULV</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 7 2013 15:42</u>	Sample Date and Time:	<u>Oct 7 2013 16:03</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.1</u>	Temperature:	<u>1.9</u>
Specific Conductivity (SPC):	<u>99.9</u>	Specific Conductivity (SPC):	<u>58.0</u>
pH:	<u>7.43</u>	pH:	<u>7.20</u>
Site Conditions		Site Conditions	
flow level:	<u>mod</u>	flow level:	<u>mod</u>
turbidity (clear, light, mod, high):	<u>light</u>	turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)	<u>none</u>	ice thickness (if applicable)	<u>ice on rocks + overhangs vry.</u>
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8136</u>	Datasheet:	<u>8138</u>
Downstream:	<u>8136</u>	Downstream:	<u>8139</u>
Upstream:	<u>8134</u>	Upstream:	<u>8140</u>
Overview:		Overview:	

Site Information		Site Information	
Site Name:	<u>VW3</u>	Site Name:	<u>VW1</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 7, 2013 - 16:13</u>	Sample Date and Time:	<u>Oct 7, 13 16:55</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.8</u>	Temperature:	<u>1.6</u>
Specific Conductivity (SPC):	<u>154.0</u>	Specific Conductivity (SPC):	<u>221.3</u>
pH:	<u>7.33</u>	pH:	<u>7.96</u>
Site Conditions		Site Conditions	
flow level:	<u>mod</u>	flow level:	<u>high</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>high</u>
ice thickness (if applicable)	<u>none</u>	ice thickness (if applicable)	<u>some on logs + rocks</u>
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8141</u>	Datasheet:	<u>8143</u>
Downstream:	<u>8143</u>	Downstream:	<u>8145</u>
Upstream:	<u>8142</u>	Upstream:	<u>8144</u>
Overview:		Overview:	

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0167

Weather: breeze, cloudy
3°C

Field Samplers: NMM, LLD

Project Name: Mount Nansen Water Quality

Page 4 of 6

YSI Calibration Performed? Yes / No

Date / Time: 11:30 Oct 7 2013

Site Information		Site Information	
Site Name:	VW2	Site Name:	V8
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	Oct 7, 2013 17:16	Sample Date and Time:	Oct 7 2013 17:34
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.4°C	Temperature:	2.0°C
Specific Conductivity (SPC):	651.7	Specific Conductivity (SPC):	444.0
pH:	8.21	pH:	8.15
		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	clear	turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable)	some along margins in veg.	ice thickness (if applicable)	w/a
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	8146	Downstream:	8148
Upstream:	8147	Overview:	
		Datasheet:	8149
		Downstream:	8151
		Upstream:	8150
		Overview:	8152

Site Information		Site Information	
Site Name:	VG MAIN	Site Name:	P4
Sample Identifier:	8	Sample Identifier:	
Sample Date and Time:	Oct 7, 2013 17:57	Sample Date and Time:	Oct 8, 2013
Replicate ID (if applicable)	n/a	Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	2.0	Temperature:	2.1
Specific Conductivity (SPC):	372.1	Specific Conductivity (SPC):	388.7
pH:	8.05	pH:	7.61
		Turbidity:	
Site Conditions		Site Conditions	
flow level:	mod.	flow level:	
turbidity (clear, light, mod, high):	clear	turbidity (clear, light, mod, high):	
ice thickness (if applicable)	some on veg.	ice thickness (if applicable)	
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	8153	Downstream:	8154
Upstream:	8155	Overview:	8156
		Datasheet:	8159
		Downstream:	8157
		Upstream:	8158
		Overview:	

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0199

Weather: wind, light breeze -2°C

Field Samplers: MM, LW

Project Name: Faro Surface Water Quality

Page 5 of

YSI Calibration Performed? Yes / No

Date / Time: 7:45 Oct 8, 2013

Site Information		Site Information	
Site Name:	<u>AI</u>	Site Name:	<u>RS</u>
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	<u>Oct 8 2013 9:49</u>	Sample Date and Time:	<u>Oct 8, 2013 9:46</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.3</u>	Temperature:	<u>0.0</u>
Specific Conductivity (SPC):	<u>260.3</u>	Specific Conductivity (SPC):	<u>276.0</u>
pH:	<u>7.56</u>	pH:	<u>7.58</u>
Site Conditions		Site Conditions	
flow level:	<u>low</u>	flow level:	<u>low-mod</u>
turbidity (clear, light, mod, high):	<u>light</u>	turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)	<u>none</u>	ice thickness (if applicable)	<u>on veg + rocks</u>
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8160</u>	Downstream:	<u>8161</u>
Upstream:	<u>8162</u>	Overview:	
Datasheet:	<u>8163</u>	Downstream:	<u>8165</u>
Upstream:	<u>8164</u>	Overview:	

Site Information		Site Information	
Site Name:	<u>R4</u>	Site Name:	<u>R6</u>
Sample Identifier:	<u>Rose ck</u>	Sample Identifier:	<u>Anvil ck</u>
Sample Date and Time:	<u>Oct 8, 2013 10:07</u>	Sample Date and Time:	<u>Oct 8, 2013 10:06</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.0</u>	Temperature:	<u>0.1</u>
Specific Conductivity (SPC):	<u>272.5</u>	Specific Conductivity (SPC):	<u>279.7</u>
pH:	<u>7.67</u>	pH:	<u>7.79</u>
Site Conditions		Site Conditions	
flow level:	<u>mod</u>	flow level:	<u>mod</u>
turbidity (clear, light, mod, high):	<u>light</u>	turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)	<u>on veg + margins</u>	ice thickness (if applicable)	<u>on margins</u>
Notes		Notes	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	<u>8166</u>	Downstream:	<u>8167</u>
Upstream:	<u>8168</u>	Overview:	<u>8169</u>
Datasheet:		Downstream:	<u>8170</u>
Upstream:		Overview:	<u>8171</u>

Field Blank ID _____
 Trip Blank ID _____



Project No.: 13-Y-0167

Weather: overcast, light breeze
-20C

Field Samplers: MM, CW

Project Name: Mount Nansen Water Quality

Page 6 of 6

YSI Calibration Performed? Yes / No

Date / Time: 10:51 Oct 8, 2013

Site Information		Site Information	
Site Name:	V20 A	Site Name:	P1
Sample Identifier:		Sample Identifier:	
Sample Date and Time:	Oct 8, 2013 10:51	Sample Date and Time:	Oct 8, 2013 11:16
Replicate ID (if applicable)		Replicate ID (if applicable)	Replicate 4
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.7	Temperature:	2.0
Specific Conductivity (SPC):	400.1	Specific Conductivity (SPC):	312.9
pH:	7.12	pH:	8.02
		Turbidity:	
Site Conditions		Site Conditions	
flow level:	low	flow level:	
turbidity (clear, light, mod, high):	light	turbidity (clear, light, mod, high):	
ice thickness (if applicable)	< 1cm over slow sit	ice thickness (if applicable)	
Notes		Notes	
(if pit incl. DO and ice thickness)	lots of orange algae, leaves	(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	8172	Downstream:	8174/8176
Upstream:	8173 / 8175	Overview:	
		Datasheet:	forgot pictures
		Downstream:	
		Upstream:	
		Overview:	

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

Field Blank ID Field Blank 10:51 Oct 8/2013
 Trip Blank ID _____



**APPENDIX C LABORATORY ANALYSIS
SUMMARY TABLE,
OCTOBER 7-8, 2013**

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Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	VW1	VW2	VW3	FC	R1	R4	R5	R6	W10	X14	A1
				Date Sampled Time	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	8-Oct-13	8-Oct-13	7-Oct-13
				Detection Limit											
Temperature (in-situ)	°C	-	-	-	1.6	1.4	1.8	1.2	1.6	0.0	0.0	0.1	1.8	1.3	0.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	321.3	651.7	154.0	31.8	199.4	272.5	276.0	279.2	105.3	279.4	260.3
pH (in-situ)	-	6.5 - 9.0	6.5	-	7.96	8.21	7.33	6.20	7.67	7.67	7.58	7.79	6.87	7.62	7.56
Hardness (as CaCO3)	mg/L	-	-	0.5	155	353	68.2	12.5	93.6	128	135	139	49	133	127
pH (lab)	pH	6.5 - 9.0	6.5	0.1	8.2	8.42	7.81	7.28	8.02	8.03	8.12	8.17	7.84	7.96	8.1
Total Suspended Solids	mg/L	-	15	1.0	36.6	<1.0	<1.0	2.4	1	1.2	1	1.6	<1.0	1	5.8
Total Dissolved Solids	mg/L	-	-	3.0	182	393	86.4	19.6	110	153	154	152	59.1	161	148
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	134	296	50.4	14	85.9	104	118	126	52.8	101	106
Ammonia, Total (as N)	mg/L	0.75	1.4	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0151	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	0.97	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.17	0.167	0.081	0.073	0.11	0.103	0.084	0.069	0.098	0.11	0.088
Nitrate (as N)	mg/L	13.0	-	0.005	0.0701	0.107	0.106	<0.0050	0.0552	0.0826	0.103	0.117	<0.0050	0.0576	0.0917
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorous (P), Total	mg/L	-	-	0.002	0.0264	0.0109	<0.0020	0.004	0.0024	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0051
Sulfate (SO4)	mg/L	-	-	0.5	39.4	88.8	26.8	2.02	19.2	38.9	29.5	21.7	3.98	46.1	32.5
Dissolved Organic Carbon	mg/L	-	-	0.5	3.43	2.24	2.58	3.15	2.25	2.21	2.06	1.84	2.92	2.23	2.71
Total Organic Carbon	mg/L	-	-	0.5	3.52	2.04	2.49	2.68	2.26	2.19	2.06	1.93	2.91	2.24	2.71
Aluminum (Al)-Total	mg/L	0.1	-	0.003	1.24	0.0048	0.0285	0.125	0.0357	0.0306	0.0258	0.0365	0.0286	0.0222	0.189
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	0.00014	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	<0.00010	<0.00010	0.00012
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.00179	0.00039	0.00064	0.00018	0.00039	0.00036	0.00042	0.00045	0.00015	0.00045	0.0007
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0751	0.115	0.0261	0.0168	0.0405	0.0575	0.0598	0.0657	0.0142	0.0465	0.0634
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	0.00033	0.02	0.00001	0.000051	0.000098	0.000023	0.000012	<0.000010	0.000023	0.000018	0.000016	0.000016	0.000034	0.000029
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.000048	0.000098	0.000024	0.000006	0.000031	0.000041	0.000043	0.000044	0.000018	0.000042	0.000041
Calcium (Ca)-Total	mg/L	-	-	0.02	40.2	88.4	20.1	3.77	28.6	38.3	38.6	40.2	17.1	39.8	37.6
Chromium (Cr)-Total	mg/L	0.0089	-	0.0001	0.0028	0.00022	0.00013	0.00029	0.00016	0.00023	0.00022	0.00024	0.00014	0.00017	0.0005
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00081	<0.00010	<0.00010	<0.00010	<0.00010	0.00034	0.00015	<0.00010	<0.00010	0.00065	0.00023
Copper (Cu)-Total (Lab Result)	mg/L	0.002	0.2	0.0005	0.00273	0.00055	0.00057	0.00077	<0.00050	0.00068	0.00064	0.00059	0.00104	0.00058	0.00241
Copper (Cu)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.00344	0.00695	0.00171	0.00040	0.00223	0.00292	0.00306	0.00313	0.00129	0.00302	0.00290
Iron (Fe)-Total	mg/L	0.3	-	0.01	1.69	<0.010	0.087	0.131	0.258	0.251	0.189	0.17	0.023	0.413	0.33
Lead (Pb)-Total (Lab Result)	mg/L	0.003	0.2	0.00005	0.00166	<0.000050	0.000121	0.00131	0.000061	0.000224	0.000073	<0.000050	0.000099	0.000179	0.000208
Lead (Pb)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00005	0.005558	0.015848	0.001955	0.000225	0.002925	0.004356	0.004662	0.004838	0.001283	0.004574	0.004313
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00412	0.00311	0.00066	0.00158	0.00161	0.00245	0.00198	0.00181	0.00095	0.0029	0.00235
Magnesium (Mg)-Total	mg/L	-	-	0.005	13.5	31.9	4.7	0.725	5.29	7.99	9.17	10.4	2.07	8.83	8.34
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.0698	0.000184	0.00699	0.00321	0.0289	0.29	0.136	0.0193	0.000533	0.583	0.122
Molybdenum (Mo)-Total	mg/L	0.0073	0.5	0.00005	0.000635	0.00255	0.000116	<0.000050	0.000211	0.000564	0.000818	0.00112	0.000223	0.000473	0.000847
Nickel (Ni)-Total (Lab Result)	mg/L	0.1	0.5	0.0005	0.00314	0.00095	<0.00050	<0.00050	<0.00050	0.0013	0.00077	<0.00050	<0.00050	0.0016	0.00125
Nickel (Ni)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.13335	0.24926	0.07145	0.01968	0.09089	0.11530	0.12006	0.12276	0.05558	0.11871	0.11462
Phosphorus (P)-Total	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	-	-	0.05	0.983	0.975	0.336	0.154	0.782	0.904	0.941	1.02	0.434	0.851	1.12
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	0.00029	0.0031	<0.00010	<0.00010	0.00016	0.00045	0.0006	0.00073	<0.00010	0.00029	0.00055
Silicon (Si)-Total	mg/L	-	-	0.05	6.51	4.63	5.26	7.2	4.49	4.83	4.73	4.66	6.52	5	5.26
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	2.87	2.39	1.6	1.67	1.96	2.24	1.92	1.72	1.75	2.57	2.11
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.193	0.327	0.0951	0.0242	0.152	0.155	0.13	0.119	0.0583	0.161	0.132
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<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
Titanium (Ti)-Total	mg/L	-	-	0.01	0.034	<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	0.00228	0.00629	0.00136	0.000142	0.00163	0.00131	0.00149	0.0017	0.000145	0.00146	0.00152
Vanadium (V)-Total	mg/L	-	-	0.001	0.0032	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0116	0.0042	0.0148	<0.0030	<0.0030	0.0267	0.0127	<0.0030	<0.0030	0.0521	0.0084
Zirconium (Zr) - Total	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	0.00116	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.003	0.006	0.0011	0.0152	0.0291	0.0047	0.0066	0.0053	0.0053	0.0089	0.0091	0.0067
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	<0.00010	0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.00063	0.00035	0.00058	0.00011	0.00031	0.00029	0.00032	0.00036	0.00013	0.00037	0.00048
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0518	0.113	0.0259	0.0152	0.0404	0.0558	0.0598	0.0625	0.0134	0.0452	0.056
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050



Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	VW1	VW2	VW3	FC	R1	R4	R5	R6	W10	X14	A1
				Date Sampled Time	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	8-Oct-13	8-Oct-13	7-Oct-13
				Detection Limit											
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	0.00033	0.02	0.00001	0.00001	0.000093	0.000017	<0.000010	<0.000010	0.000022	0.000016	0.000013	0.000016	0.000028	0.000019
<i>Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000048	0.000098	0.000024	0.000006	0.000031	0.000041	0.000043	0.000044	0.000018	0.000042	0.000041
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	40.6	88.6	19.7	3.83	28.7	37.9	38.8	39.1	16.4	38.9	37.1
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	0.00014	<0.00010	0.00011	<0.00010	0.00012	0.0001	<0.00010	<0.00010	<0.00010	0.00012
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	0.00013	<0.00010	<0.00010	0.0006	0.00011
Copper (Cu)-Dissolved (Lab Result)	mg/L	0.002	0.2	0.0005	0.0006	0.00043	0.00046	0.0006	0.00038	0.00055	0.00045	0.00043	0.0009	0.00043	0.00064
<i>Copper (Cu)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00344	0.00695	0.00171	0.00040	0.00223	0.00292	0.00306	0.00313	0.00129	0.00302	0.00290
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.044	<0.010	0.061	0.025	0.143	0.147	0.111	0.08	<0.010	0.281	0.067
Lead (Pb)-Dissolved (Lab Result)	mg/L	0.003	0.2	0.00005	<0.000050	<0.000050	<0.000050	0.000521	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000056	<0.000050
<i>Lead (Pb)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.005558	0.015848	0.001955	0.000225	0.002925	0.004356	0.004662	0.004838	0.001283	0.004574	0.004313
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00249	0.00312	<0.00050	0.00145	0.00152	0.00234	0.00197	0.0016	0.00081	0.00277	0.00213
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	13.1	32	4.61	0.716	5.34	8.01	9.34	9.95	1.96	8.64	8.22
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.038	0.000076	0.00669	0.00193	0.0265	0.264	0.13	0.0158	0.000199	0.564	0.108
Molybdenum (Mo)-Dissolved	mg/L	0.0073	0.5	0.00005	0.000568	0.00253	0.000094	<0.000050	0.000213	0.000515	0.000778	0.000996	0.000195	0.000436	0.000764
Nickel (Ni)-Dissolved (Lab Result)	mg/L	0.1	0.5	0.0005	<0.00050	0.00087	<0.00050	<0.00050	<0.00050	0.00113	0.00068	<0.00050	<0.00050	0.00148	0.00081
<i>Nickel (Ni)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.13335	0.24926	0.07145	0.01968	0.09089	0.11530	0.12006	0.12276	0.05558	0.11871	0.11462
Phosphorus (P)-Dissolved	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	mg/L	-	-	0.05	0.692	0.957	0.336	0.135	0.787	0.891	0.936	0.955	0.413	0.835	1.06
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	0.00031	0.00355	<0.00010	<0.00010	0.00017	0.00047	0.00059	0.00069	<0.00010	0.00026	0.00053
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.91	4.58	5.01	6.84	4.39	4.79	4.7	4.29	6.6	4.8	4.69
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
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.78	2.36	1.58	1.65	1.96	2.2	1.92	1.64	1.67	2.48	2.09
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.189	0.34	0.0943	0.0237	0.146	0.147	0.129	0.112	0.0547	0.156	0.126
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00225	0.00622	0.00127	0.000118	0.00161	0.00127	0.00146	0.00164	0.000131	0.00139	0.00146
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.5	0.003	0.0031	0.0031	0.0139	0.0025	<0.0010	0.0243	0.0109	<0.0010	0.0011	0.0497	0.0054
Zirconium (Zr) - Dissolved	mg/L	0.03	0.5	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines - CCME - Freshwater Aquatic Life
Faro Effluent Quality Standards

Color Key:	Exceeds CCME Guideline
	Exceeds Faro Effluent Quality Standards
	Exceeds both CCME and Faro Standards
	Exceeds Hardness Dependent Calculated Guideline (CCME)



Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	P4	V8	V17A	V20A	VR	VGMAIN	DUPLICATE #2	TRAVEL	NWID	USFR	GCULV
				Date Sampled Time	8-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	7-Oct-13	8-Oct-13	8-Oct-13	7-Oct-13
				Detection Limit											
Temperature (in-situ)	°C	-	-	-	3.1	2.0	1.4	1.7	1.4	2.0	-	-	3.4	1.0	1.9
Specific Conductivity (in-situ)	µS/cm	-	-	-	338.7	414.0	160.6	406.1	61.0	372.1	-	-	2759.0	54.3	58.0
pH (in-situ)	-	6.5 - 9.0	6.5	-	7.61	8.15	6.69	7.12	6.31	8.05	-	-	7.20	6.41	7.20
Hardness (as CaCO3)	mg/L	-	-	0.5	171	212	73.6	213	26.3	188	167	<0.50	1770	22.8	24
pH (lab)	pH	6.5 - 9.0	6.5	0.1	8.11	8.24	7.65	7.66	7.46	8.15	8.15	5.69	7.49	7.43	7.56
Total Suspended Solids	mg/L	-	15	1.0	4.4	6	<1.0	28.4	<1.0	<1.0	3.4	<1.0	27	<1.0	1
Total Dissolved Solids	mg/L	-	-	3.0	207	248	94.5	218	35.5	222	196	<1.0	2510	32.4	33.6
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	114	144	43.6	214	26	114	112	<2.0	166	20.6	21.6
Ammonia, Total (as N)	mg/L	0.75	1.4	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0201	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	4.27	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.145	0.133	0.083	0.132	0.067	0.103	0.122	<0.020	<0.40	0.059	0.062
Nitrate (as N)	mg/L	13.0	-	0.005	0.115	0.0959	0.184	<0.0050	<0.0050	0.12	0.0078	<0.0050	0.5	0.0204	0.0195
Nitrite (as N)	mg/L	0.06	-	0.001	0.0219	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.020	<0.0010	<0.0010
Phosphorous (P), Total	mg/L	-	-	0.002	0.0069	0.0043	0.0023	0.0407	<0.0020	<0.0020	0.0044	<0.0020	<0.0020	0.0031	0.0033
Sulfate (SO4)	mg/L	-	-	0.5	69.4	81.6	36.7	7.42	5.62	83.3	65.7	<0.50	1770	7.47	7.62
Dissolved Organic Carbon	mg/L	-	-	0.5	2.99	2.85	2.84	3.68	2.94	2.44	3.09	-	3.06	2.18	2.2
Total Organic Carbon	mg/L	-	-	0.5	2.98	2.94	2.81	4.19	2.88	2.48	3.05	<0.50	3.61	2.21	2.24
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.118	0.341	0.173	0.0149	0.0288	0.0185	0.0892	<0.0050	0.889	0.0245	0.0259
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	0.00018	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00050	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.00057	0.00079	0.00123	0.00139	0.00021	0.00041	0.00056	<0.00010	0.00162	0.00025	0.00023
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0738	0.0553	0.0203	0.117	0.023	0.0419	0.0725	<0.000050	0.0446	0.0222	0.0229
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050	<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	<0.0025	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	0.00033	0.02	0.00001	0.00015	0.000051	0.000024	<0.000010	0.00001	0.000031	0.000188	<0.000010	0.0289	<0.000010	<0.000010
Cadmium (Cd)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.000053	0.000063	0.000025	0.000063	0.000010	0.000057	0.000051	-	0.000392	0.000009	0.000010
Calcium (Ca)-Total	mg/L	-	-	0.02	43.1	52.5	19.5	58.2	8.08	46.8	42.3	<0.020	325	7.39	7.58
Chromium (Cr)-Total	mg/L	0.0089	-	0.0001	0.00029	0.00109	0.00029	0.00022	0.00014	0.00016	0.00022	<0.00010	0.00084	0.00013	0.00019
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00012	0.00032	0.00011	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	0.0292	<0.00010	<0.00010
Copper (Cu)-Total (Lab Result)	mg/L	0.002	0.2	0.0005	0.00109	0.00155	0.00082	<0.00050	0.00057	0.00072	0.00101	<0.00050	0.0367	<0.00050	<0.00050
Copper (Cu)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.00374	0.00449	0.00182	0.00451	0.00076	0.00406	0.00367	-	0.02755	0.00067	0.00070
Iron (Fe)-Total	mg/L	0.3	-	0.01	0.216	0.527	0.411	1.45	0.022	0.073	0.164	<0.010	6.56	0.091	0.094
Lead (Pb)-Total (Lab Result)	mg/L	0.003	0.2	0.00005	0.000119	0.00106	0.00121	0.000146	<0.000050	0.000168	0.000072	<0.000050	0.07	<0.000050	<0.000050
Lead (Pb)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.00005	0.006299	0.008281	0.002154	0.008331	0.000581	0.007106	0.006112	-	0.123400	0.000485	0.000517
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00298	0.00352	0.00062	0.00176	<0.00050	0.00256	0.00273	<0.00050	0.0299	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.005	14.8	20.3	5.31	16	1.47	18	15	<0.0050	253	1.12	1.16
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.0199	0.0253	0.0198	0.118	0.000758	0.00862	0.0158	<0.00050	3.39	0.00969	0.00841
Molybdenum (Mo)-Total	mg/L	0.0073	0.5	0.00005	0.00119	0.000863	0.000088	0.000337	0.000096	0.000545	0.00116	<0.000050	<0.00025	0.00019	0.000193
Nickel (Ni)-Total (Lab Result)	mg/L	0.1	0.5	0.0005	0.00478	0.00197	0.00054	<0.00050	<0.00050	0.00058	0.00509	<0.00050	0.132	<0.00050	<0.00050
Nickel (Ni)-Total (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.14369	0.16919	0.07571	0.16979	0.03464	0.15442	0.14113	-	0.84881	0.03107	0.03231
Phosphorus (P)-Total	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<1.5	<0.30	<0.30
Potassium (K)-Total	mg/L	-	-	0.05	0.686	0.873	0.296	0.506	0.307	0.719	0.675	<0.050	6.14	0.29	0.312
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	0.00107	0.00088	<0.00010	<0.00010	<0.00010	0.00042	0.00107	<0.00010	0.00097	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	3.28	5.23	5.59	5.61	4.82	4.74	3.09	<0.050	6.95	3.54	3.56
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000064	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	1.74	2.77	1.6	2.26	1.45	2.6	1.71	<0.050	17.7	1.5	1.5
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.19	0.217	0.0835	0.273	0.0432	0.185	0.187	<0.00020	1.79	0.0462	0.0471
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000309	<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	<0.00050	<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	<0.050	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00161	0.00366	0.00106	0.000448	0.000293	0.00362	0.00155	<0.000010	0.00352	0.000384	0.000436
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0118	0.0136	0.0292	0.0037	<0.0030	0.0149	0.0148	<0.0030	46.2	<0.0030	<0.0030
Zirconium (Zr) - Total	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.0040	<0.00080	<0.00080
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.003	0.013	0.0043	0.0217	0.0015	0.0172	0.0049	0.0132	-	0.0079	0.0099	0.0084
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	-	<0.00050	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.0004	0.00043	0.00076	0.00058	0.00017	0.00037	0.0004	-	<0.00050	0.00019	0.0002
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0679	0.0476	0.0187	0.114	0.0233	0.0403	0.0657	-	0.0281	0.0221	0.0222
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00050	<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	-	<0.0025	<0.00050	<0.00050



Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	P4	V8	V17A	V20A	VR	VGMAIN	DUPLICATE #2	TRAVEL	NWID	USFR	GCULV
				Date Sampled Time	8-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	7-Oct-13	7-Oct-13	8-Oct-13	7-Oct-13	8-Oct-13	8-Oct-13	7-Oct-13
				Detection Limit											
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	0.00033	0.02	0.00001	0.000123	0.000032	<0.000010	<0.000010	<0.000010	0.000031	0.000144	-	0.0276	<0.000010	<0.000010
<i>Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000053	0.000063	0.000025	0.000063	0.000010	0.000057	0.000051	-	0.000392	0.000009	0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	44.2	51.7	20.3	57.8	8.15	46.1	43.7	-	312	7.32	7.73
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00050	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	-	0.0282	<0.00010	<0.00010
Copper (Cu)-Dissolved (Lab Result)	mg/L	0.002	0.2	0.0005	0.00074	0.00064	0.0005	<0.00020	0.00046	0.0006	0.00071	-	0.0088	0.00032	0.00027
<i>Copper (Cu)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00374	0.00449	0.00182	0.00451	0.00076	0.00406	0.00367	-	0.02755	0.00067	0.00070
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.029	0.014	0.105	0.207	<0.010	0.02	0.035	-	2.85	0.047	0.047
Lead (Pb)-Dissolved (Lab Result)	mg/L	0.003	0.2	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	0.00036	0.000057	<0.000050
<i>Lead (Pb)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.006299	0.008281	0.002154	0.008331	0.000581	0.007106	0.006112	-	0.123400	0.000485	0.000517
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00288	0.00314	<0.00050	0.00182	<0.00050	0.00227	0.00251	-	0.0281	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	14.7	20.2	5.58	16.8	1.46	17.6	14.1	-	242	1.09	1.14
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0121	0.00958	0.0152	0.107	0.000377	0.00516	0.00959	-	3.19	0.00533	0.00396
Molybdenum (Mo)-Dissolved	mg/L	0.0073	0.5	0.00005	0.00114	0.000778	0.000072	0.000296	0.000092	0.000539	0.00112	-	<0.00025	0.000172	0.000191
Nickel (Ni)-Dissolved (Lab Result)	mg/L	0.1	0.5	0.0005	0.0042	0.00091	<0.00050	<0.00050	<0.00050	0.00057	0.00445	-	0.126	<0.00050	<0.00050
<i>Nickel (Ni)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.14369	0.16919	0.07571	0.16979	0.03464	0.15442	0.14113	-	0.84881	0.03107	0.03231
Phosphorus (P)-Dissolved	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	-	<1.5	<0.30	<0.30
Potassium (K)-Dissolved	mg/L	-	-	0.05	0.659	0.799	0.29	0.509	0.311	0.689	0.628	-	5.89	0.288	0.276
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	0.00107	0.00092	<0.00010	<0.00010	<0.00010	0.00039	0.00112	-	0.00087	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.02	4.69	5.53	5.57	4.78	4.62	2.89	-	6.11	3.52	3.64
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	-	<0.000050	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.71	2.74	1.65	2.34	1.44	2.5	1.64	-	17.4	1.48	1.49
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.194	0.214	0.0841	0.26	0.0428	0.184	0.192	-	1.75	0.0457	0.0481
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	0.000275	<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	-	<0.00050	<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	-	<0.050	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00154	0.00366	0.00102	0.000417	0.000296	0.00356	0.00156	-	0.0033	0.000353	0.00041
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0050	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.5	0.003	0.0071	0.0081	0.0248	0.0018	0.0011	0.0128	0.0098	-	43.8	<0.0010	<0.0010
Zirconium (Zr) - Dissolved	mg/L	0.03	0.5	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	-	<0.0040	<0.00080	<0.00080

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines - CCME - Fres
Faro Effluent Quality Standards

Color Key:	Exceeds CCME Guideline
	Exceeds Faro Effluent Quality Standards
	Exceeds both CCME and Faro Standards
	Exceeds Hardness Dependent Calculated Guideline (CCME)



Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	K8	P1	DUPLICATE #1	FIELD
				Date Sampled Time	7-Oct-13	8-Oct-13	8-Oct-13 X14	8-Oct-13
				Detection Limit				
Temperature (in-situ)	°C	-	-	-	1.1	2.8	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	99.9	312.9	-	-
pH (in-situ)	-	6.5 - 9.0	6.5	-	7.43	8.02	-	-
Hardness (as CaCO3)	mg/L	-	-	0.5	44.4	169	140	<0.50
pH (lab)	pH	6.5 - 9.0	6.5	0.1	7.72	8.2	7.97	5.66
Total Suspended Solids	mg/L	-	15	1.0	<1.0	2.8	1	<1.0
Total Dissolved Solids	mg/L	-	-	3.0	56.1	197	164	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	41.6	112	101	<2.0
Ammonia, Total (as N)	mg/L	0.75	1.4	0.005	<0.0050	<0.0050	0.0138	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.08	0.122	0.11	<0.020
Nitrate (as N)	mg/L	13.0	-	0.005	0.0299	0.0081	0.0618	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorous (P), Total	mg/L	-	-	0.002	<0.0020	0.0048	<0.0020	<0.0020
Sulfate (SO4)	mg/L	-	-	0.5	10.3	65.7	46.1	<0.50
Dissolved Organic Carbon	mg/L	-	-	0.5	1.84	3.37	2.91	<0.50
Total Organic Carbon	mg/L	-	-	0.5	1.82	3.31	3	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0461	0.0832	0.0236	<0.0050
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	<0.00010	0.00017	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.0002	0.00052	0.00048	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0241	0.0699	0.044	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	0.00033	0.02	0.00001	<0.000010	0.000184	0.000033	<0.000010
<i>Cadmium (Cd)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.00001</i>	<i>0.000016</i>	<i>0.000052</i>	<i>0.000044</i>	<i>-</i>
Calcium (Ca)-Total	mg/L	-	-	0.02	14.9	41.9	42.5	<0.020
Chromium (Cr)-Total	mg/L	0.0089	-	0.0001	0.0002	0.00022	0.00022	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00065	<0.00010
Copper (Cu)-Total (Lab Result)	mg/L	0.002	0.2	0.0005	<0.00050	0.00098	0.00059	<0.00050
<i>Copper (Cu)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.0005</i>	<i>0.00118</i>	<i>0.00370</i>	<i>0.00315</i>	<i>-</i>
Iron (Fe)-Total	mg/L	0.3	-	0.01	0.076	0.167	0.435	<0.010
Lead (Pb)-Total (Lab Result)	mg/L	0.003	0.2	0.00005	0.000356	0.000071	0.000216	<0.000050
<i>Lead (Pb)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.00005</i>	<i>0.001132</i>	<i>0.006205</i>	<i>0.004883</i>	<i>-</i>
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00112	0.00247	0.00303	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.005	1.9	14.5	9.98	<0.0050
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.00253	0.0152	0.623	<0.000050
Molybdenum (Mo)-Total	mg/L	0.0073	0.5	0.00005	0.00009	0.00115	0.000502	<0.000050
Nickel (Ni)-Total (Lab Result)	mg/L	0.1	0.5	0.0005	<0.00050	0.00495	0.00162	<0.00050
<i>Nickel (Ni)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.0005</i>	<i>0.05157</i>	<i>0.14241</i>	<i>0.12343</i>	<i>-</i>
Phosphorus (P)-Total	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	-	-	0.05	0.403	0.656	0.896	<0.050
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	<0.00010	0.00108	0.00028	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.97	3.16	4.71	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	1.9	1.67	2.78	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.094	0.187	0.171	<0.00020
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00139	0.00155	0.00154	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0107	0.0145	0.0593	<0.0030
Zirconium (Zr) - Total	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.003	0.0059	0.0129	0.0068	<0.0010
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	<0.00010	0.00016	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.00015	0.00039	0.00039	<0.00010
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0235	0.0676	0.0427	<0.000050
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050



Table C-1. Water Quality Parameter Guideline Exceedances; October 7-8, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	K8	P1	DUPLICATE #1	FIELD
				Date Sampled Time	7-Oct-13	8-Oct-13	8-Oct-13 X14	8-Oct-13
				Detection Limit				
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	0.00033	0.02	0.00001	<0.000010	0.000156	0.000029	<0.000010
<i>Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000016	0.000052	0.000044	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	14.7	43	40.5	<0.020
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00063	<0.00010
Copper (Cu)-Dissolved (Lab Result)	mg/L	0.002	0.2	0.0005	0.00031	0.00074	0.0005	<0.00020
<i>Copper (Cu)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00118	0.00370	0.00315	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	<0.010	0.035	0.302	<0.010
Lead (Pb)-Dissolved (Lab Result)	mg/L	0.003	0.2	0.00005	<0.000050	<0.000050	0.000224	<0.000050
<i>Lead (Pb)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.001132	0.006205	0.004883	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00103	0.00243	0.00271	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	1.87	15	9.4	<0.0050
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.000303	0.0098	0.595	<0.000050
Molybdenum (Mo)-Dissolved	mg/L	0.0073	0.5	0.00005	0.000088	0.00111	0.000484	<0.000050
Nickel (Ni)-Dissolved (Lab Result)	mg/L	0.1	0.5	0.0005	<0.00050	0.00468	0.00157	<0.00050
<i>Nickel (Ni)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.05157	0.14241	0.12343	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	mg/L	-	-	0.05	0.397	0.652	0.856	<0.050
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	<0.00010	0.00111	0.00033	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.95	3.05	4.47	<0.050
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.83	1.7	2.57	<0.050
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0933	0.193	0.166	<0.00020
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00133	0.00159	0.00154	<0.000010
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.5	0.003	0.0011	0.0104	0.0585	<0.0010
Zirconium (Zr) - Dissolved	mg/L	0.03	0.5	0.0008	<0.00080	<0.00080	<0.00080	<0.00080

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines - CCME - Fres
Faro Effluent Quality Standards

Color Key:	Exceeds CCME Guideline
	Exceeds Faro Effluent Quality Standards
	Exceeds both CCME and Faro Standards
	Exceeds Hardness Dependent Calculated Guideline (CCME)



**APPENDIX D QA/QC RESULTS SUMMARY,
OCTOBER 7-8, 2013**

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	X14	DUPLICATE #1 - X14	Detection Limit	QA/QC Category	Relative Percent Difference	P1	DUPLICATE #2 - P1	Detection Limit	QA/QC Category	Relative Percent Difference
Date Sampled	08-Oct-13	08-Oct-13	DL		% RPD	08-Oct-13	08-Oct-13	DL		% RPD
Physical Tests										
Hardness (as CaCO3)	133.0	140.0	0.50	RPD	-5.1	169.0	167.0	0.50	RPD	1.2
pH	8.0	8.0	0.10	RPD	-0.1	8.2	8.2	0.10	RPD	0.6
Total Suspended Solids	1.0	1.0	1.0	<DL	<DL	2.8	3.4	1.0	<2XDL	OK
Total Dissolved Solids	161.0	164.0	3.0	RPD	-1.8	197.0	196.0	3.0	RPD	0.5
Anions and Nutrients										
Alkalinity, Total (as CaCO3)	101	101	2.0	RPD	0.0	112	112	2.0	RPD	0.0
Ammonia, Total (as N)	0.02	0.01	0.0050	<2XDL	OK	<0.0050	<0.0050	0.0050	<DL	OK
Chloride (Cl)	<0.50	<0.50	0.50	<DL	OK	<0.50	<0.50	0.50	<DL	OK
Fluoride (F)	0.11	0.11	0.020	RPD	0.0	0.122	0.122	0.020	RPD	0.0
Nitrate (as N)	0.0576	0.0618	0.0050	RPD	-7.0	0.0081	0.0078	0.0050	<2XDL	OK
Nitrite (as N)	<0.0010	<0.0010	0.0010	<DL	OK	<0.0010	<0.0010	0.0010	<DL	OK
Phosphorus (P)-Total	<0.0020	<0.0020	0.0020	<DL	OK	0.0048	0.0044	0.0020	<2XDL	OK
Sulfate (SO4)	46.10	46.10	0.50	RPD	0.0	65.70	65.70	0.50	RPD	0.0
Organic / Inorganic Carbon										
Dissolved Organic Carbon	2.23	2.91	0.50	<2XDL	OK	3.37	3.09	0.50	RPD	8.7
Total Organic Carbon	2.24	3.00	0.50	<2XDL	OK	3.31	3.05	0.50	RPD	8.2
Total Metals										
Aluminum (Al)-Total	0.022	0.024	0.0030	RPD	-6.1	0.083	0.089	0.0030	RPD	-7.0
Antimony (Sb)-Total	<0.00010	<0.00010	0.00010	<DL	OK	0.00017	0.00018	0.00010	<2XDL	OK
Arsenic (As)-Total	0.00045	0.00048	0.00010	<2XDL	OK	0.00052	0.00056	0.00010	RPD	-7.4
Barium (Ba)-Total	0.0465	0.0440	0.000050	RPD	5.5	0.0699	0.0725	0.000050	RPD	-3.7
Beryllium (Be)-Total	<0.00010	<0.00010	0.00010	<DL	OK	<0.00010	<0.00010	0.00010	<DL	OK
Bismuth (Bi)-Total	<0.00050	<0.00050	0.00050	<DL	OK	<0.00050	<0.00050	0.00050	<DL	OK
Boron (B)-Total	<0.010	<0.010	0.010	<DL	OK	<0.010	<0.010	0.010	<DL	OK
Cadmium (Cd)-Total	0.000034	0.000033	0.000010	<2XDL	OK	0.000184	0.000188	0.000010	RPD	-2.2
Calcium (Ca)-Total	39.8	42.5	0.020	RPD	-6.6	41.9	42.3	0.020	RPD	-1.0
Chromium (Cr)-Total	0.000170	0.000220	0.00010	<2XDL	OK	0.000220	0.000220	0.00010	<2XDL	OK
Cobalt (Co)-Total	0.00065	0.00065	0.00010	RPD	0.0	<0.00010	<0.00010	0.00010	<DL	OK
Copper (Cu)-Total	0.00058	0.00059	0.00050	<2XDL	OK	0.00098	0.00101	0.00050	<2XDL	OK
Iron (Fe)-Total	0.413	0.435	0.010	RPD	-5.2	0.167	0.164	0.010	RPD	1.8
Lead (Pb)-Total	0.000179	0.000216	0.000050	<2XDL	OK	0.000071	0.000072	0.000050	<2XDL	OK
Lithium (Li)-Total	0.00290	0.00303	0.00050	RPD	-4.4	0.00247	0.00273	0.00050	<2XDL	OK
Magnesium (Mg)-Total	8.83	9.98	0.0050	RPD	-12.2	14.50	15.00	0.0050	RPD	-3.4
Manganese (Mn)-Total	0.5830	0.6230	0.000050	RPD	-6.6	0.0152	0.0158	0.000050	RPD	-3.9
Molybdenum (Mo)-Total	0.00047	0.00050	0.000050	RPD	-5.9	0.00115	0.00116	0.000050	RPD	-0.9
Nickel (Ni)-Total	0.00160	0.00162	0.00050	<2XDL	OK	0.00495	0.00509	0.00050	RPD	-2.8
Phosphorus (P)-Total	<0.30	<0.30	0.30	<DL	OK	<0.30	<0.30	0.30	<DL	OK
Potassium (K)-Total	0.851	0.896	0.050	RPD	-5.2	0.656	0.675	0.050	RPD	-2.9
Selenium (Se)-Total	0.00029	0.00028	0.00010	<2XDL	OK	0.001	0.001	0.00010	RPD	0.9
Silicon (Si)-Total	5.00	4.71	0.050	RPD	6.0	3.16	3.09	0.050	RPD	2.2
Silver (Ag)-Total	<0.000010	<0.000010	0.000010	<DL	OK	<0.000010	<0.000010	0.000010	<DL	OK
Sodium (Na)-Total	2.57	2.78	0.050	RPD	-7.9	1.67	1.71	0.050	RPD	-2.4
Strontium (Sr)-Total	0.161	0.171	0.00020	RPD	-6.0	0.187	0.187	0.00020	RPD	0.0
Thallium (Tl)-Total	<0.000010	<0.000010	0.000010	<DL	OK	<0.000010	<0.000010	0.000010	<DL	OK
Tin (Sn)-Total	<0.00010	<0.00010	0.00010	<DL	OK	<0.00010	<0.00010	0.00010	<DL	OK
Titanium (Ti)-Total	<0.010	<0.010	0.010	<DL	OK	<0.010	<0.010	0.010	<DL	OK
Uranium (U)-Total	0.0015	0.0015	0.000010	RPD	-5.3	0.0016	0.0016	0.000010	RPD	0.0
Vanadium (V)-Total	<0.0010	<0.0010	0.0010	<DL	OK	<0.0010	<0.0010	0.0010	<DL	OK
Zinc (Zn)-Total	0.0521	0.0593	0.0030	RPD	-12.9	0.0145	0.0148	0.0030	<2XDL	OK
Zirconium (Zr)-Total	<0.00080	<0.00080	0.0008	<DL	OK	<0.00080	<0.00080	0.0008	<DL	OK



	X14	DUPLICATE #1 - X14	Detection Limit	QA/QC Category	Relative Percent Difference	P1	DUPLICATE #2 - P1	Detection Limit	QA/QC Category	Relative Percent Difference
Date Sampled	08-Oct-13	08-Oct-13	DL		% RPD	08-Oct-13	08-Oct-13	DL		% RPD
Dissolved Metals										
Aluminum (Al)-Dissolved	0.0091	0.0068	0.0010	RPD	28.9	0.0129	0.0132	0.0010	RPD	-2.3
Antimony (Sb)-Dissolved	<0.00010	<0.00010	0.00010	<DL	OK	0.00016	0.00015	0.00010	<2XDL	OK
Arsenic (As)-Dissolved	0.00037	0.00039	0.00010	<2XDL	OK	0.00039	0.00040	0.00010	<2XDL	OK
Barium (Ba)-Dissolved	0.0452	0.0427	0.000050	RPD	5.7	0.0676	0.0657	0.000050	RPD	2.9
Beryllium (Be)-Dissolved	<0.00010	<0.00010	0.00010	<DL	OK	<0.00010	<0.00010	0.00010	<DL	OK
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	0.00050	<DL	OK	<0.00050	<0.00050	0.00050	<DL	OK
Boron (B)-Dissolved	<0.010	<0.010	0.010	<DL	OK	<0.010	<0.010	0.010	<DL	OK
Cadmium (Cd)-Dissolved	0.000028	0.000029	0.000010	<2XDL	OK	0.00016	0.00014	0.000010	RPD	8.0
Calcium (Ca)-Dissolved	38.9	40.5	0.020	RPD	-4.0	43.0	43.7	0.020	RPD	-1.6
Chromium (Cr)-Dissolved	<0.00010	<0.00010	0.00010	<DL	OK	<0.00010	<0.00010	0.00010	<DL	OK
Cobalt (Co)-Dissolved	0.00060	0.00063	0.00010	RPD	-4.9	<0.00010	<0.00010	0.00010	<DL	OK
Copper (Cu)-Dissolved	0.00043	0.00050	0.00020	<2XDL	OK	0.00074	0.00071	0.00020	<2XDL	OK
Iron (Fe)-Dissolved	0.281	0.302	0.010	RPD	-7.2	0.035	0.035	0.010	<2XDL	OK
Lead (Pb)-Dissolved	0.000056	0.000224	0.000050	RPD	-120.0	<0.000050	<0.000050	0.000050	<DL	OK
Lithium (Li)-Dissolved	0.00277	0.00271	0.00050	RPD	2.2	0.00243	0.00251	0.00050	<2XDL	OK
Magnesium (Mg)-Dissolved	8.64	9.40	0.0050	RPD	-8.4	15.00	14.10	0.0050	RPD	6.2
Manganese (Mn)-Dissolved	0.564	0.595	0.000050	RPD	-5.3	0.0098	0.0096	0.000050	RPD	2.2
Molybdenum (Mo)-Dissolved	0.00044	0.00048	0.000050	RPD	-10.4	0.00111	0.00112	0.000050	RPD	-0.9
Nickel (Ni)-Dissolved	0.001	0.002	0.00050	<2XDL	OK	0.005	0.004	0.00050	RPD	5.0
Phosphorus (P)-Dissolved	<0.30	<0.30	0.30	<DL	OK	<0.30	<0.30	0.30	<DL	OK
Potassium (K)-Dissolved	0.835	0.856	0.050	RPD	-2.5	0.652	0.628	0.050	RPD	3.8
Selenium (Se)-Dissolved	0.00026	0.00033	0.00010	<2XDL	OK	0.00111	0.00112	0.00010	RPD	-0.9
Silicon (Si)-Dissolved	4.8	4.5	0.050	RPD	7.1	3.1	2.9	0.050	RPD	5.4
Silver (Ag)-Dissolved	<0.000010	<0.000010	0.000010	<DL	OK	<0.000010	<0.000010	0.000010	<DL	OK
Sodium (Na)-Dissolved	2.5	2.6	0.050	RPD	-3.6	1.7	1.6	0.050	RPD	3.6
Strontium (Sr)-Dissolved	0.156	0.166	0.00020	RPD	-6.2	0.193	0.192	0.00020	RPD	0.5
Thallium (Tl)-Dissolved	<0.000010	<0.000010	0.000010	<DL	OK	<0.000010	<0.000010	0.000010	<DL	OK
Tin (Sn)-Dissolved	<0.00010	<0.00010	0.00010	<DL	OK	<0.00010	<0.00010	0.00010	<DL	OK
Titanium (Ti)-Dissolved	<0.010	<0.010	0.010	<DL	OK	<0.010	<0.010	0.010	<DL	OK
Uranium (U)-Dissolved	0.00139	0.00154	0.000010	RPD	-10.2	0.00159	0.00156	0.000010	RPD	1.9
Vanadium (V)-Dissolved	<0.0010	<0.0010	0.0010	<DL	OK	<0.0010	<0.0010	0.0010	<DL	OK
Zinc (Zn)-Dissolved	0.0497	0.0585	0.0030	RPD	-16.3	0.0104	0.0098	0.0030	<2XDL	OK
Zirconium (Zr) - Dissolved	<0.00080	<0.00080	0.0008	<DL	OK	<0.00080	<0.00080	0.0008	<DL	OK



**APPENDIX E ALS CERTIFICATE OF ANALYSIS,
OCTOBER 7-8, 2013**

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ENVIRONMENTAL DYNAMICS INC.
ATTN: MEGHAN MARJANOVIC
2195 - 2nd Avenue
Whitehorse YT Y1A 3T8

Date Received: 08-OCT-13
Report Date: 21-OCT-13 14:58 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1374997
Project P.O. #: NOT SUBMITTED
Job Reference: FARO SURFACE WQ 13-Y-0199
C of C Numbers: 1, 2, 3, 4
Legal Site Desc:

Can Dang
Senior Account Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-1 Water 07-OCT-13 16:55 VW1	L1374997-2 Water 07-OCT-13 17:16 VW2	L1374997-3 Water 07-OCT-13 16:13 VW3	L1374997-4 Water 07-OCT-13 14:48 FC	L1374997-5 Water 07-OCT-13 15:20 R1
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	155	353	68.2	12.5	93.6
	pH (pH)	8.20	8.42	7.81	7.28	8.02
	Total Suspended Solids (mg/L)	36.6	<1.0	<1.0	2.4	1.0
	Total Dissolved Solids (mg/L)	182	393	86.4	19.6	110
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	134	296	50.4	14.0	85.9
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	0.97	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.170	0.167	0.081	0.073	0.110
	Nitrate (as N) (mg/L)	0.0701	0.107	0.106	<0.0050	0.0552
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0264	0.0109	<0.0020	0.0040	0.0024
	Sulfate (SO4) (mg/L)	39.4	88.8	26.8	2.02	19.2
	Anion Sum (meq/L)	3.54	7.78	1.58	0.33	2.13
	Cation Sum (meq/L)	3.24	7.18	1.45	0.33	1.98
	Cation - Anion Balance (%)	-4.4	-4.1	-4.3	0.7	-3.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	3.43	2.24	2.58	3.15	2.25
	Total Organic Carbon (mg/L)	3.52	2.04	2.49	2.68	2.26
Total Metals	Aluminum (Al)-Total (mg/L)	1.24	0.0048	0.0285	0.125	0.0357
	Antimony (Sb)-Total (mg/L)	0.00014	0.00021	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00179	0.00039	0.00064	0.00018	0.00039
	Barium (Ba)-Total (mg/L)	0.0751	0.115	0.0261	0.0168	0.0405
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000051	0.000098	0.000023	0.000012	<0.000010
	Calcium (Ca)-Total (mg/L)	40.2	88.4	20.1	3.77	28.6
	Chromium (Cr)-Total (mg/L)	0.00280	0.00022	0.00013	0.00029	0.00016
	Cobalt (Co)-Total (mg/L)	0.00081	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00273	0.00055	0.00057	0.00077	<0.00050
	Iron (Fe)-Total (mg/L)	1.69	<0.010	0.087	0.131	0.258
	Lead (Pb)-Total (mg/L)	0.00166	<0.000050	0.000121	0.00131	0.000061
	Lithium (Li)-Total (mg/L)	0.00412	0.00311	0.00066	0.00158	0.00161
	Magnesium (Mg)-Total (mg/L)	13.5	31.9	4.70	0.725	5.29
	Manganese (Mn)-Total (mg/L)	0.0698	0.000184	0.00699	0.00321	0.0289
	Molybdenum (Mo)-Total (mg/L)	0.000635	0.00255	0.000116	<0.000050	0.000211
	Nickel (Ni)-Total (mg/L)	0.00314	0.00095	<0.00050	<0.00050	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-6 Water 08-OCT-13 10:07 R4	L1374997-7 Water 08-OCT-13 09:46 R5	L1374997-8 Water 08-OCT-13 10:06 R6	L1374997-9 Water 07-OCT-13 14:15 W10	L1374997-10 Water 07-OCT-13 14:52 X14
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	128	135	139	49.0	133
	pH (pH)	8.03	8.12	8.17	7.84	7.96
	Total Suspended Solids (mg/L)	1.2	1.0	1.6	<1.0	1.0
	Total Dissolved Solids (mg/L)	153	154	152	59.1	161
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	104	118	126	52.8	101
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0151
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.103	0.084	0.069	0.098	0.110
	Nitrate (as N) (mg/L)	0.0826	0.103	0.117	<0.0050	0.0576
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	38.9	29.5	21.7	3.98	46.1
	Anion Sum (meq/L)	2.89	2.99	2.98	1.14	2.98
	Cation Sum (meq/L)	2.69	2.82	2.87	1.06	2.82
	Cation - Anion Balance (%)	-3.6	-2.8	-1.9	-3.5	-2.7
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.21	2.06	1.84	2.92	2.23
	Total Organic Carbon (mg/L)	2.19	2.06	1.93	2.91	2.24
Total Metals	Aluminum (Al)-Total (mg/L)	0.0306	0.0258	0.0365	0.0286	0.0222
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011	0.00012	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00036	0.00042	0.00045	0.00015	0.00045
	Barium (Ba)-Total (mg/L)	0.0575	0.0598	0.0657	0.0142	0.0465
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000023	0.000018	0.000016	0.000016	0.000034
	Calcium (Ca)-Total (mg/L)	38.3	38.6	40.2	17.1	39.8
	Chromium (Cr)-Total (mg/L)	0.00023	0.00022	0.00024	0.00014	0.00017
	Cobalt (Co)-Total (mg/L)	0.00034	0.00015	<0.00010	<0.00010	0.00065
	Copper (Cu)-Total (mg/L)	0.00068	0.00064	0.00059	0.00104	0.00058
	Iron (Fe)-Total (mg/L)	0.251	0.189	0.170	0.023	0.413
	Lead (Pb)-Total (mg/L)	0.000224	0.000073	<0.000050	0.000099	0.000179
	Lithium (Li)-Total (mg/L)	0.00245	0.00198	0.00181	0.00095	0.00290
	Magnesium (Mg)-Total (mg/L)	7.99	9.17	10.4	2.07	8.83
	Manganese (Mn)-Total (mg/L)	0.290	0.136	0.0193	0.000533	0.583
	Molybdenum (Mo)-Total (mg/L)	0.000564	0.000818	0.00112	0.000223	0.000473
	Nickel (Ni)-Total (mg/L)	0.00130	0.00077	<0.00050	<0.00050	0.00160

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1374997-11	L1374997-12	L1374997-13	L1374997-14	L1374997-15
	Description	Water	Water	Water	Water	Water
	Sampled Date	08-OCT-13	08-OCT-13	07-OCT-13	07-OCT-13	08-OCT-13
	Sampled Time	09:19	09:02	17:34	12:48	10:51
	Client ID	A1	P4	V8	V17A	V20A
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	127	171	212	73.6	213
	pH (pH)	8.10	8.11	8.24	7.65	7.66
	Total Suspended Solids (mg/L)	5.8	4.4	6.0	<1.0	28.4
	Total Dissolved Solids (mg/L)	148	207	248	94.5	218
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	106	114	144	43.6	214
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	4.27	0.62	<0.50	<0.50
	Fluoride (F) (mg/L)	0.088	0.145	0.133	0.083	0.132
	Nitrate (as N) (mg/L)	0.0917	0.115	0.0959	0.184	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	0.0219	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0051	0.0069	0.0043	0.0023	0.0407
	Sulfate (SO4) (mg/L)	32.5	69.4	81.6	36.7	7.42
	Anion Sum (meq/L)	2.80	3.87	4.61	1.65	4.44
	Cation Sum (meq/L)	2.66	3.51	4.38	1.56	4.39
	Cation - Anion Balance (%)	-2.7	-4.8	-2.5	-2.9	-0.6
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.71	2.99	2.85	2.84	3.68
	Total Organic Carbon (mg/L)	2.71	2.98	2.94	2.81	4.19
Total Metals	Aluminum (Al)-Total (mg/L)	0.189	0.118	0.341	0.173	0.0149
	Antimony (Sb)-Total (mg/L)	0.00012	0.00018	0.00012	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00070	0.00057	0.00079	0.00123	0.00139
	Barium (Ba)-Total (mg/L)	0.0634	0.0738	0.0553	0.0203	0.117
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000029	0.000150	0.000051	0.000024	<0.000010
	Calcium (Ca)-Total (mg/L)	37.6	43.1	52.5	19.5	58.2
	Chromium (Cr)-Total (mg/L)	0.00050	0.00029	0.00109	0.00029	0.00022
	Cobalt (Co)-Total (mg/L)	0.00023	0.00012	0.00032	0.00011	0.00017
	Copper (Cu)-Total (mg/L)	0.00241	0.00109	0.00155	0.00082	<0.00050
	Iron (Fe)-Total (mg/L)	0.330	0.216	0.527	0.411	1.45
	Lead (Pb)-Total (mg/L)	0.000208	0.000119	0.00106	0.00121	0.000146
	Lithium (Li)-Total (mg/L)	0.00235	0.00298	0.00352	0.00062	0.00176
	Magnesium (Mg)-Total (mg/L)	8.34	14.8	20.3	5.31	16.0
	Manganese (Mn)-Total (mg/L)	0.122	0.0199	0.0253	0.0198	0.118
	Molybdenum (Mo)-Total (mg/L)	0.000847	0.00119	0.000863	0.000088	0.000337
	Nickel (Ni)-Total (mg/L)	0.00125	0.00478	0.00197	0.00054	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

21-OCT-13 14:58 (MT)

Version: FINAL

	Sample ID	L1374997-16	L1374997-17	L1374997-18	L1374997-19	L1374997-20
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-OCT-13	07-OCT-13	08-OCT-13	08-OCT-13	07-OCT-13
	Sampled Time	13:07	17:57	11:16		14:34
	Client ID	VR	VGMAIN	DUPLICATE 2	TRAVEL BLANK	NWID
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	26.3	188	167	<0.50	1770
	pH (pH)	7.46	8.15	8.15	5.69	7.49
	Total Suspended Solids (mg/L)	<1.0	<1.0	3.4	<1.0	27.0
	Total Dissolved Solids (mg/L)	35.5	222	196	<1.0	2510
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	26.0	114	112	<2.0	166
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	0.0201
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<10 ^{DLA}
	Fluoride (F) (mg/L)	0.067	0.103	0.122	<0.020	<0.40 ^{DLA}
	Nitrate (as N) (mg/L)	<0.0050	0.120	0.0078	<0.0050	0.50 ^{DLA}
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.020 ^{DLA}
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0044	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	5.62	83.3	65.7	<0.50	1770
	Anion Sum (meq/L)	0.64	4.02	3.61	<0.10	40.3
	Cation Sum (meq/L)	0.60	3.87	3.43	<0.10	38.0
	Cation - Anion Balance (%)	-3.3	-1.9	-2.6	0.0	-3.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.94	2.44	3.09		3.06
	Total Organic Carbon (mg/L)	2.88	2.48	3.05	<0.50	3.61
Total Metals	Aluminum (Al)-Total (mg/L)	0.0288	0.0185	0.0892	<0.0030	0.889 ^{DLA}
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	0.00018	<0.00010	<0.00050 ^{DLA}
	Arsenic (As)-Total (mg/L)	0.00021	0.00041	0.00056	<0.00010	0.00162
	Barium (Ba)-Total (mg/L)	0.0230	0.0419	0.0725	<0.000050	0.0446 ^{DLA}
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050 ^{DLA}
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.0025 ^{DLA}
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.050 ^{DLA}
	Cadmium (Cd)-Total (mg/L)	0.000010	0.000031	0.000188	<0.000010	0.0289
	Calcium (Ca)-Total (mg/L)	8.08	46.8	42.3	<0.020	325
	Chromium (Cr)-Total (mg/L)	0.00014	0.00016	0.00022	<0.00010	0.00084
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.0292
	Copper (Cu)-Total (mg/L)	0.00057	0.00072	0.00101	<0.00050	0.0367
	Iron (Fe)-Total (mg/L)	0.022	0.073	0.164	<0.010	6.56
	Lead (Pb)-Total (mg/L)	<0.000050	0.000168	0.000072	<0.000050	0.0700
	Lithium (Li)-Total (mg/L)	<0.00050	0.00256	0.00273	<0.00050	0.0299
	Magnesium (Mg)-Total (mg/L)	1.47	18.0	15.0	<0.0050	253
	Manganese (Mn)-Total (mg/L)	0.000758	0.00862	0.0158	<0.000050	3.39 ^{DLA}
	Molybdenum (Mo)-Total (mg/L)	0.000096	0.000545	0.00116	<0.000050	<0.00025 ^{DLA}
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00058	0.00509	<0.00050	0.132

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1374997-21	L1374997-22	L1374997-23	L1374997-24	L1374997-25
	Description	Water	Water	Water	Water	Water
	Sampled Date	07-OCT-13	07-OCT-13	07-OCT-13	08-OCT-13	08-OCT-13
	Sampled Time	13:22	16:03	15:42	11:16	10:51
	Client ID	USFR	GCULV	K8	P1	FIELD BLANK
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	22.8	24.0	44.4	169	<0.50
	pH (pH)	7.43	7.56	7.72	8.20	5.66
	Total Suspended Solids (mg/L)	<1.0	1.0	<1.0	2.8	<1.0
	Total Dissolved Solids (mg/L)	32.4	33.6	56.1	197	<1.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	20.6	21.6	41.6	112	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.059	0.062	0.080	0.122	<0.020
	Nitrate (as N) (mg/L)	0.0204	0.0195	0.0299	0.0081	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0031	0.0033	<0.0020	0.0048	<0.0020
	Sulfate (SO4) (mg/L)	7.47	7.62	10.3	65.7	<0.50
	Anion Sum (meq/L)	0.57	0.59	1.05	3.61	<0.10
	Cation Sum (meq/L)	0.53	0.55	0.98	3.47	<0.10
	Cation - Anion Balance (%)	-3.6	-3.5	-3.6	-2.0	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.18	2.20	1.84	3.37	<0.50
	Total Organic Carbon (mg/L)	2.21	2.24	1.82	3.31	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0245	0.0259	0.0461	0.0832	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00017	<0.00010
	Arsenic (As)-Total (mg/L)	0.00025	0.00023	0.00020	0.00052	<0.00010
	Barium (Ba)-Total (mg/L)	0.0222	0.0229	0.0241	0.0699	<0.000050
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000184	<0.000010
	Calcium (Ca)-Total (mg/L)	7.39	7.58	14.9	41.9	<0.020
	Chromium (Cr)-Total (mg/L)	0.00013	0.00019	0.00020	0.00022	<0.00010
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00098	<0.00050
	Iron (Fe)-Total (mg/L)	0.091	0.094	0.076	0.167	<0.010
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000356	0.000071	<0.000050
	Lithium (Li)-Total (mg/L)	<0.00050	<0.00050	0.00112	0.00247	<0.00050
	Magnesium (Mg)-Total (mg/L)	1.12	1.16	1.90	14.5	<0.0050
	Manganese (Mn)-Total (mg/L)	0.00969	0.00841	0.00253	0.0152	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.000190	0.000193	0.000090	0.00115	<0.000050
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00495	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID				
	L1374997-26 Water 08-OCT-13 14:52 DUPLICATE 1				
Grouping	Analyte				
WATER					
Physical Tests	Hardness (as CaCO3) (mg/L)	140			
	pH (pH)	7.97			
	Total Suspended Solids (mg/L)	1.0			
	Total Dissolved Solids (mg/L)	164			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	101			
	Ammonia, Total (as N) (mg/L)	0.0138			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	0.110			
	Nitrate (as N) (mg/L)	0.0618			
	Nitrite (as N) (mg/L)	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020			
	Sulfate (SO4) (mg/L)	46.1			
	Anion Sum (meq/L)	2.99			
	Cation Sum (meq/L)	2.97			
	Cation - Anion Balance (%)	-0.3			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.91			
	Total Organic Carbon (mg/L)	3.00			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0236			
	Antimony (Sb)-Total (mg/L)	<0.00010			
	Arsenic (As)-Total (mg/L)	0.00048			
	Barium (Ba)-Total (mg/L)	0.0440			
	Beryllium (Be)-Total (mg/L)	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.00050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.000033			
	Calcium (Ca)-Total (mg/L)	42.5			
	Chromium (Cr)-Total (mg/L)	0.00022			
	Cobalt (Co)-Total (mg/L)	0.00065			
	Copper (Cu)-Total (mg/L)	0.00059			
	Iron (Fe)-Total (mg/L)	0.435			
	Lead (Pb)-Total (mg/L)	0.000216			
	Lithium (Li)-Total (mg/L)	0.00303			
	Magnesium (Mg)-Total (mg/L)	9.98			
	Manganese (Mn)-Total (mg/L)	0.623			
	Molybdenum (Mo)-Total (mg/L)	0.000502			
	Nickel (Ni)-Total (mg/L)	0.00162			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1374997-1	L1374997-2	L1374997-3	L1374997-4	L1374997-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	07-OCT-13	07-OCT-13	07-OCT-13	07-OCT-13	07-OCT-13
		Sampled Time	16:55	17:16	16:13	14:48	15:20
		Client ID	VW1	VW2	VW3	FC	R1
Grouping	Analyte						
WATER							
Total Metals	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.983	0.975	0.336	0.154	0.782
	Selenium (Se)-Total (mg/L)		0.00029	0.00310	<0.00010	<0.00010	0.00016
	Silicon (Si)-Total (mg/L)		6.51	4.63	5.26	7.20	4.49
	Silver (Ag)-Total (mg/L)		0.000016	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		2.87	2.39	1.60	1.67	1.96
	Strontium (Sr)-Total (mg/L)		0.193	0.327	0.0951	0.0242	0.152
	Thallium (Tl)-Total (mg/L)		0.000020	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.034	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.00228	0.00629	0.00136	0.000142	0.00163
	Vanadium (V)-Total (mg/L)		0.0032	0.0011	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		0.0116	0.0042	0.0148	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	0.00116
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0060	0.0011	0.0152	0.0291	0.0047
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	0.00020	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00063	0.00035	0.00058	0.00011	0.00031
	Barium (Ba)-Dissolved (mg/L)		0.0518	0.113	0.0259	0.0152	0.0404
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.000010	0.000093	0.000017	<0.000010	<0.000010
	Calcium (Ca)-Dissolved (mg/L)		40.6	88.6	19.7	3.83	28.7
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	0.00014	<0.00010	0.00011	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00060	0.00043	0.00046	0.00060	0.00038
	Iron (Fe)-Dissolved (mg/L)		0.044	<0.010	0.061	0.025	0.143
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	0.000521	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.00249	0.00312	<0.00050	0.00145	0.00152
	Magnesium (Mg)-Dissolved (mg/L)		13.1	32.0	4.61	0.716	5.34
	Manganese (Mn)-Dissolved (mg/L)		0.0380	0.000076	0.00669	0.00193	0.0265
	Molybdenum (Mo)-Dissolved (mg/L)		0.000568	0.00253	0.000094	<0.000050	0.000213
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	0.00087	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		0.692	0.957	0.336	0.135	0.787
	Selenium (Se)-Dissolved (mg/L)		0.00031	0.00355	<0.00010	<0.00010	0.00017

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-6 Water 08-OCT-13 10:07 R4	L1374997-7 Water 08-OCT-13 09:46 R5	L1374997-8 Water 08-OCT-13 10:06 R6	L1374997-9 Water 07-OCT-13 14:15 W10	L1374997-10 Water 07-OCT-13 14:52 X14
Grouping	Analyte					
WATER						
Total Metals	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.904	0.941	1.02	0.434	0.851
	Selenium (Se)-Total (mg/L)	0.00045	0.00060	0.00073	<0.00010	0.00029
	Silicon (Si)-Total (mg/L)	4.83	4.73	4.66	6.52	5.00
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.24	1.92	1.72	1.75	2.57
	Strontium (Sr)-Total (mg/L)	0.155	0.130	0.119	0.0583	0.161
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00131	0.00149	0.00170	0.000145	0.00146
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0267	0.0127	<0.0030	<0.0030	0.0521
	Zirconium (Zr)-Total (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0066	0.0053	0.0053	0.0089	0.0091
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00029	0.00032	0.00036	0.00013	0.00037
	Barium (Ba)-Dissolved (mg/L)	0.0558	0.0598	0.0625	0.0134	0.0452
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000022	0.000016	0.000013	0.000016	0.000028
	Calcium (Ca)-Dissolved (mg/L)	37.9	38.8	39.1	16.4	38.9
	Chromium (Cr)-Dissolved (mg/L)	0.00012	0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00025	0.00013	<0.00010	<0.00010	0.00060
	Copper (Cu)-Dissolved (mg/L)	0.00055	0.00045	0.00043	0.00090	0.00043
	Iron (Fe)-Dissolved (mg/L)	0.147	0.111	0.080	<0.010	0.281
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	0.000056
	Lithium (Li)-Dissolved (mg/L)	0.00234	0.00197	0.00160	0.00081	0.00277
	Magnesium (Mg)-Dissolved (mg/L)	8.01	9.34	9.95	1.96	8.64
	Manganese (Mn)-Dissolved (mg/L)	0.264	0.130	0.0158	0.000199	0.564
	Molybdenum (Mo)-Dissolved (mg/L)	0.000515	0.000778	0.000996	0.000195	0.000436
	Nickel (Ni)-Dissolved (mg/L)	0.00113	0.00068	<0.00050	<0.00050	0.00148
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.891	0.936	0.955	0.413	0.835
	Selenium (Se)-Dissolved (mg/L)	0.00047	0.00059	0.00069	<0.00010	0.00026

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1374997-11	L1374997-12	L1374997-13	L1374997-14	L1374997-15
	Description	Water	Water	Water	Water	Water
	Sampled Date	08-OCT-13	08-OCT-13	07-OCT-13	07-OCT-13	08-OCT-13
	Sampled Time	09:19	09:02	17:34	12:48	10:51
	Client ID	A1	P4	V8	V17A	V20A
Grouping	Analyte					
WATER						
Total Metals	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	1.12	0.686	0.873	0.296	0.506
	Selenium (Se)-Total (mg/L)	0.00055	0.00107	0.00088	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	5.26	3.28	5.23	5.59	5.61
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	2.11	1.74	2.77	1.60	2.26
	Strontium (Sr)-Total (mg/L)	0.132	0.190	0.217	0.0835	0.273
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00152	0.00161	0.00366	0.00106	0.000448
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	0.0014	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0084	0.0118	0.0136	0.0292	0.0037
	Zirconium (Zr)-Total (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0067	0.0130	0.0043	0.0217	0.0015
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00048	0.00040	0.00043	0.00076	0.00058
	Barium (Ba)-Dissolved (mg/L)	0.0560	0.0679	0.0476	0.0187	0.114
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000019	0.000123	0.000032	<0.000010	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	37.1	44.2	51.7	20.3	57.8
	Chromium (Cr)-Dissolved (mg/L)	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00011	<0.00010	<0.00010	<0.00010	0.00012
	Copper (Cu)-Dissolved (mg/L)	0.00064	0.00074	0.00064	0.00050	<0.00020
	Iron (Fe)-Dissolved (mg/L)	0.067	0.029	0.014	0.105	0.207
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.00213	0.00288	0.00314	<0.00050	0.00182
	Magnesium (Mg)-Dissolved (mg/L)	8.22	14.7	20.2	5.58	16.8
	Manganese (Mn)-Dissolved (mg/L)	0.108	0.0121	0.00958	0.0152	0.107
	Molybdenum (Mo)-Dissolved (mg/L)	0.000764	0.00114	0.000778	0.000072	0.000296
	Nickel (Ni)-Dissolved (mg/L)	0.00081	0.00420	0.00091	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	1.06	0.659	0.799	0.290	0.509
	Selenium (Se)-Dissolved (mg/L)	0.00053	0.00107	0.00092	<0.00010	<0.00010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1374997-16	L1374997-17	L1374997-18	L1374997-19	L1374997-20
		Description	Water	Water	Water	Water	Water
		Sampled Date	07-OCT-13	07-OCT-13	08-OCT-13	08-OCT-13	07-OCT-13
		Sampled Time	13:07	17:57	11:16		14:34
		Client ID	VR	VGMAIN	DUPLICATE 2	TRAVEL BLANK	NWID
Grouping	Analyte						
WATER							
Total Metals	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<1.5 ^{DLA}
	Potassium (K)-Total (mg/L)		0.307	0.719	0.675	<0.050	6.14
	Selenium (Se)-Total (mg/L)		<0.00010	0.00042	0.00107	<0.00010	0.00097
	Silicon (Si)-Total (mg/L)		4.82	4.74	3.09	<0.050	6.95
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	0.000064
	Sodium (Na)-Total (mg/L)		1.45	2.60	1.71	<0.050	17.7
	Strontium (Sr)-Total (mg/L)		0.0432	0.185	0.187	<0.00020	1.79
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	0.000309
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00050 ^{DLA}
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.050 ^{DLA}
	Uranium (U)-Total (mg/L)		0.000293	0.00362	0.00155	<0.000010	0.00352 ^{DLA}
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0050 ^{DLA}
	Zinc (Zn)-Total (mg/L)		<0.0030	0.0149	0.0148	<0.0030	46.2 ^{DLA}
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.0040 ^{DLA}
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0172	0.0049	0.0132		0.0079 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	0.00015		<0.00050 ^{DLA}
	Arsenic (As)-Dissolved (mg/L)		0.00017	0.00037	0.00040		<0.00050 ^{DLA}
	Barium (Ba)-Dissolved (mg/L)		0.0233	0.0403	0.0657		0.0281 ^{DLA}
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		<0.00050 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050		<0.0025 ^{DLA}
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010		<0.050 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)		<0.000010	0.000031	0.000144		0.0276
	Calcium (Ca)-Dissolved (mg/L)		8.15	46.1	43.7		312 ^{DLA}
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		<0.00050 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010		0.0282
	Copper (Cu)-Dissolved (mg/L)		0.00046	0.00060	0.00071		0.0088
	Iron (Fe)-Dissolved (mg/L)		<0.010	0.020	0.035		2.85
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050		0.00036
	Lithium (Li)-Dissolved (mg/L)		<0.00050	0.00227	0.00251		0.0281
	Magnesium (Mg)-Dissolved (mg/L)		1.46	17.6	14.1		242
	Manganese (Mn)-Dissolved (mg/L)		0.000377	0.00516	0.00959		3.19 ^{DLA}
	Molybdenum (Mo)-Dissolved (mg/L)		0.000092	0.000539	0.00112		<0.00025 ^{DLA}
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	0.00057	0.00445		0.126 ^{DLA}
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30		<1.5 ^{DLA}
	Potassium (K)-Dissolved (mg/L)		0.311	0.689	0.628		5.89
	Selenium (Se)-Dissolved (mg/L)		<0.00010	0.00039	0.00112		0.00087

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1374997-21	L1374997-22	L1374997-23	L1374997-24	L1374997-25
		Description	Water	Water	Water	Water	Water
		Sampled Date	07-OCT-13	07-OCT-13	07-OCT-13	08-OCT-13	08-OCT-13
		Sampled Time	13:22	16:03	15:42	11:16	10:51
		Client ID	USFR	GCULV	K8	P1	FIELD BLANK
Grouping	Analyte						
WATER							
Total Metals	Phosphorus (P)-Total (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)		0.290	0.312	0.403	0.656	<0.050
	Selenium (Se)-Total (mg/L)		<0.00010	<0.00010	<0.00010	0.00108	<0.00010
	Silicon (Si)-Total (mg/L)		3.54	3.56	4.97	3.16	<0.050
	Silver (Ag)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)		1.50	1.50	1.90	1.67	<0.050
	Strontium (Sr)-Total (mg/L)		0.0462	0.0471	0.0940	0.187	<0.00020
	Thallium (Tl)-Total (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)		0.000384	0.000436	0.00139	0.00155	<0.000010
	Vanadium (V)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)		<0.0030	<0.0030	0.0107	0.0145	<0.0030
	Zirconium (Zr)-Total (mg/L)		<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0099	0.0084	0.0059	0.0129	<0.0010
	Antimony (Sb)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00016	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00019	0.00020	0.00015	0.00039	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0221	0.0222	0.0235	0.0676	<0.000050
	Beryllium (Be)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	0.000156	<0.000010
	Calcium (Ca)-Dissolved (mg/L)		7.32	7.73	14.7	43.0	<0.020
	Chromium (Cr)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00032	0.00027	0.00031	0.00074	<0.00020
	Iron (Fe)-Dissolved (mg/L)		0.047	0.047	<0.010	0.035	<0.010
	Lead (Pb)-Dissolved (mg/L)		0.000057	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		<0.00050	<0.00050	0.00103	0.00243	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)		1.09	1.14	1.87	15.0	<0.0050
	Manganese (Mn)-Dissolved (mg/L)		0.00533	0.00396	0.000303	0.00980	<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)		0.000172	0.000191	0.000088	0.00111	<0.000050
	Nickel (Ni)-Dissolved (mg/L)		<0.00050	<0.00050	<0.00050	0.00468	<0.00050
	Phosphorus (P)-Dissolved (mg/L)		<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)		0.288	0.276	0.397	0.652	<0.050
	Selenium (Se)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	0.00111	<0.00010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-26			
		Water			
		08-OCT-13			
		14:52			
		DUPLICATE 1			
Grouping	Analyte				
WATER					
Total Metals	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	0.896			
	Selenium (Se)-Total (mg/L)	0.00028			
	Silicon (Si)-Total (mg/L)	4.71			
	Silver (Ag)-Total (mg/L)	<0.000010			
	Sodium (Na)-Total (mg/L)	2.78			
	Strontium (Sr)-Total (mg/L)	0.171			
	Thallium (Tl)-Total (mg/L)	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010			
	Uranium (U)-Total (mg/L)	0.00154			
	Vanadium (V)-Total (mg/L)	<0.0010			
	Zinc (Zn)-Total (mg/L)	0.0593			
	Zirconium (Zr)-Total (mg/L)	<0.00080			
Dissolved Metals	Dissolved Metals Filtration Location	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0068			
	Antimony (Sb)-Dissolved (mg/L)	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00039			
	Barium (Ba)-Dissolved (mg/L)	0.0427			
	Beryllium (Be)-Dissolved (mg/L)	<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050			
	Boron (B)-Dissolved (mg/L)	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.000029			
	Calcium (Ca)-Dissolved (mg/L)	40.5			
	Chromium (Cr)-Dissolved (mg/L)	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	0.00063			
	Copper (Cu)-Dissolved (mg/L)	0.00050			
	Iron (Fe)-Dissolved (mg/L)	0.302			
	Lead (Pb)-Dissolved (mg/L)	0.000224			
	Lithium (Li)-Dissolved (mg/L)	0.00271			
	Magnesium (Mg)-Dissolved (mg/L)	9.40			
	Manganese (Mn)-Dissolved (mg/L)	0.595			
	Molybdenum (Mo)-Dissolved (mg/L)	0.000484			
	Nickel (Ni)-Dissolved (mg/L)	0.00157			
	Phosphorus (P)-Dissolved (mg/L)	<0.30			
	Potassium (K)-Dissolved (mg/L)	0.856			
	Selenium (Se)-Dissolved (mg/L)	0.00033			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1374997-1	L1374997-2	L1374997-3	L1374997-4	L1374997-5
Description	Water	Water	Water	Water	Water	Water
Sampled Date	07-OCT-13	07-OCT-13	07-OCT-13	07-OCT-13	07-OCT-13	07-OCT-13
Sampled Time	16:55	17:16	16:13	16:13	14:48	15:20
Client ID	VW1	VW2	VW3	VW3	FC	R1
Grouping	Analyte					
WATER						
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	4.91	4.58	5.01	6.84	4.39
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.78	2.36	1.58	1.65	1.96
	Strontium (Sr)-Dissolved (mg/L)	0.189	0.340	0.0943	0.0237	0.146
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00225	0.00622	0.00127	0.000118	0.00161
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0031	0.0031	0.0139	0.0025	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-6 Water 08-OCT-13 10:07 R4	L1374997-7 Water 08-OCT-13 09:46 R5	L1374997-8 Water 08-OCT-13 10:06 R6	L1374997-9 Water 07-OCT-13 14:15 W10	L1374997-10 Water 07-OCT-13 14:52 X14
Grouping	Analyte					
WATER						
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	4.79	4.70	4.29	6.60	4.80
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.20	1.92	1.64	1.67	2.48
	Strontium (Sr)-Dissolved (mg/L)	0.147	0.129	0.112	0.0547	0.156
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00127	0.00146	0.00164	0.000131	0.00139
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0243	0.0109	<0.0010	0.0011	0.0497
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L1374997-11 Water 08-OCT-13 09:19 A1	L1374997-12 Water 08-OCT-13 09:02 P4	L1374997-13 Water 07-OCT-13 17:34 V8	L1374997-14 Water 07-OCT-13 12:48 V17A	L1374997-15 Water 08-OCT-13 10:51 V20A	
Grouping	Analyte					
WATER						
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	4.69	3.02	4.69	5.53	5.57
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	2.09	1.71	2.74	1.65	2.34
	Strontium (Sr)-Dissolved (mg/L)	0.126	0.194	0.214	0.0841	0.260
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00146	0.00154	0.00366	0.00102	0.000417
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0054	0.0071	0.0081	0.0248	0.0018
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1374997-16	L1374997-17	L1374997-18	L1374997-19	L1374997-20
Description	Water	Water	Water	Water	Water	Water
Sampled Date	07-OCT-13	07-OCT-13	07-OCT-13	08-OCT-13	08-OCT-13	07-OCT-13
Sampled Time	13:07	17:57	17:57	11:16	11:16	14:34
Client ID	VR	VGMAIN	VGMAIN	DUPLICATE 2	TRAVEL BLANK	NWID
Grouping	Analyte					
WATER						
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	4.78	4.62	2.89		6.11
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		<0.000050 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	1.44	2.50	1.64		17.4
	Strontium (Sr)-Dissolved (mg/L)	0.0428	0.184	0.192		1.75
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		0.000275 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00050 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		<0.050 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.000296	0.00356	0.00156		0.00330 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		<0.0050 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	0.0011	0.0128	0.0098		43.8 ^{DLA}
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080		<0.0040 ^{DLA}

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID	L1374997-21 Water 07-OCT-13 13:22 USFR	L1374997-22 Water 07-OCT-13 16:03 GCULV	L1374997-23 Water 07-OCT-13 15:42 K8	L1374997-24 Water 08-OCT-13 11:16 P1	L1374997-25 Water 08-OCT-13 10:51 FIELD BLANK	
Grouping	Analyte					
WATER						
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	3.52	3.64	4.95	3.05	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.48	1.49	1.83	1.70	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.0457	0.0481	0.0933	0.193	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000353	0.000410	0.00133	0.00159	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	0.0011	0.0104	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1374997-26 Water 08-OCT-13 14:52 DUPLICATE 1			
Grouping	Analyte				
WATER					
Dissolved Metals	Silicon (Si)-Dissolved (mg/L)	4.47			
	Silver (Ag)-Dissolved (mg/L)	<0.000010			
	Sodium (Na)-Dissolved (mg/L)	2.57			
	Strontium (Sr)-Dissolved (mg/L)	0.166			
	Thallium (Tl)-Dissolved (mg/L)	<0.000010			
	Tin (Sn)-Dissolved (mg/L)	<0.00010			
	Titanium (Ti)-Dissolved (mg/L)	<0.010			
	Uranium (U)-Dissolved (mg/L)	0.00154			
	Vanadium (V)-Dissolved (mg/L)	<0.0010			
	Zinc (Zn)-Dissolved (mg/L)	0.0585			
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080			

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1374997-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-MAN-WR	Water	Alkalinity by Manual Titration	APHA 2320
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
		Conductivity by Meter	APHA 2510 (B)

Reference Information

EC-MAN-WR	Water		
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using an electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.			
Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:			
Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Weston et al.			
P-T-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorous
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorous is determined colourimetrically after persulphate digestion of the sample.			
PH-MAN-WR	Water	pH by Meter	APHA 4500-H (B)
"This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode."			
TDS-CALC-VA	Water	TDS (Calculated)	APHA 1030E (20TH EDITION)
This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".			
TSS-LOW-WR	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 D
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids are determined by filtering a sample through a glass fibre filter and drying the filter at 104 degrees celsius.			
ZR-D-MS-VA	Water	Dissolved Zr in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
ZR-T-MS-VA	Water	Total Zr in Water by ICPMS	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			

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

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

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



Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)												
Company:	ED I	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)												
Contact:	Meghan Marjanovic	<input checked="" type="checkbox"/> PDF	<input checked="" type="checkbox"/> Excel	<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT												
Address:	2195 - 2nd Ave Y1A 3A2			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT												
Phone:	867-393-4882	Fax:		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT												
Invoice To	Same as Report?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Analysis Request												
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No														
Company:	Environmental Dynamics Inc	Client / Project Information	Job #:	Faro Surface WQ 13-Y-0199												
Contact:	Shannon Jenner sjenner@edynamics.com	PO / A/E:														
Address:	2195 - 2nd Ave, Y1A 3A2	LSD:														
Phone:	867-393-4882	Quote #:	230556													
Lab Work Order # (for use only)		ALS Contact:														
Sample	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	ALP	PCT	VA	ANIONS-ALL-IC-WR	DOC/DKN/TDN/TDP/DNH	TOC/COD/TKN/TN/TP/NH3/N	TSS-VA, TDS-VA	PH-MAN-WR	EC-MAN-WR	MET-D-BCMDG-A	MET-T-BCMDG-VA	Number of Containers
1	VW1	07-Oct-13	16:55	Water	X	X	X	X	X	X	X	X	X	X	X	5
2	VW2	07-Oct-13	17:16	Water	X	X	X	X	X	X	X	X	X	X	X	5
3	VW3	07-Oct-13	16:13	Water	X	X	X	X	X	X	X	X	X	X	X	5
4	FC	07-Oct-13	13:48	Water	X	X	X	X	X	X	X	X	X	X	X	5
5	R1	07-Oct-13	15:20	Water	X	X	X	X	X	X	X	X	X	X	X	5



Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Please format data according to CH2M HILL requirements for Faro (talk to Brent).
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
 Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE / (USE ONLY)		SHIPMENT RECEIPT / (USE ONLY)		SHIPMENT VERIFICATION / (USE ONLY)	
Released by:	Date (dd-mm-yy)	Received by:	Date:	Verified by:	Date:
Meghan Marjanovic	08-Oct-13	[Signature]	8-Oct-13		
Time (hh:mm)	17:00	Time (hh:mm)	4:30	Time:	
		Temperature:	4.2 °C		
		Observations:			
		If Yes add SIF			

1.0, 3.3, 1.7 °C

GENF 18.01 Front



Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)									
Company: EDI	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
Contact: Meghan Marjanovic	Email 1: mmjaranovic@edynamics.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
Address: 2195 - 2nd Ave	Email 2: Y1A 3A2		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
Phone: 867-393-4882	Email 3: Y1A 3A2		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
Invoice To: Same as Report?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)									
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Job #:	Faro Surface WQ 13-Y-0199	F/P	P								
Company: Environmental Dynamics Inc	PO / AFE:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P										
Contact: Shannon Jenner sjenner@edynamics.com	LSD:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P										
Address: 2195 - 2nd Ave, Y1A 3A2	Quote #:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P										
Phone: 867-393-4882	ALS Contact:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P										
Lab Work Order # (Lab Use Only)		ALS Contact:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P									
Sample Identification (This description will appear on the report)		Sampler:		<input type="checkbox"/> F <input type="checkbox"/> P <input type="checkbox"/> F/P									
Sample #	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	ALK-PCT-VA	ANIONS-ALL-IC-WR	DOC/DKN/TDN/TDP/DNH	TOC/COD/TKN/TN/TP/NH3/N	TSS-VA, TDS-VA	PH-MAN-WR	EC-MAN-WR	MET-D-BCMDG-A	MET-T-BCMDG-VA	Number of Containers
13	07-Oct-13	17:34	Water	X	X	X	X	X	X	X	X	X	5
14	07-Oct-13	12:48	Water	X	X	X	X	X	X	X	X	X	5
15	08-Oct-13	10:51	Water	X	X	X	X	X	X	X	X	X	5
16	07-Oct-13	13:07	Water	X	X	X	X	X	X	X	X	X	5
17	07-Oct-13	17:57	Water	X	X	X	X	X	X	X	X	X	5
18	08-Oct-13	11:16	Water	X	X	X	X	X	X	X	X	X	5
19	08-Oct-13	11:16	Water	X	X	X	X	X	X	X	X	X	5
Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details													
Please format data according to CH2M HILL requirements for Faro Project.													
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.													
Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.													
By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.													
SHIPMENT RECEIPTION (Lab Use Only)													
Released by: <i>[Signature]</i>	Date (dd-mm-yy): 08-05-13	Time (hh-mm): 17:00	Received by: <i>[Signature]</i>	Date: 8-Oct-13	Time: 4:30	Temperature: 3.3 °C	Verified by:	Date:	Time:	Observations: Yes / No ?	If Yes add SIF		
SHIPMENT RECEIPTION (Lab Use Only)													
SHIPMENT VERIFICATION (Lab Use Only)													

MEGHAN MARJANOVIC

08-05-13 17:00

8-Oct-13 4:30

3.3 °C

4.2, 1.0, 1.7 °C

GENF 18.01 Front

