

Faro Pelly River Aquatics Program

June 4-6, 2013 Field Report

Prepared for:

Yukon

Energy Mines and Resources
Assessment and Abandoned Mines

Box 2703, K-419
Whitehorse, Yukon
Y1A 2C6

Prepared by:

EDI Environmental Dynamics Inc.
2195-2nd Avenue
Whitehorse, Yukon
Y1A 3T8

EDI Contact:

Meghan Marjanovic
Meighan Kearns
867-393-4882

EDI Project No:

13-Y-0199
August, 2013



PRINCE GEORGE • VANCOUVER • NANAIMO • GRANDE PRAIRIE • WHITEHORSE

www.edynamics.com

This page is intentionally blank.



EXECUTIVE SUMMARY

Assessment and Abandoned Mines Branch 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 spring sampling event conducted from June 4 to 6, 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. 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 at the time of the spring sampling event were high with flooded riparian vegetation at many stations. Turbidity levels were also observed to be relatively high at many sites. Sampling locations for each station were consistent with previous sampling programs, with some exceptions. Some stations on the Pelly River and Anvil Creek (P1, P4, and R5) were sampled from alternate sampling locations due to a lack of safe helicopter landing areas due to the high water levels. Several other sites were difficult to locate due to inaccurate geographic coordinates and lack of station signage or flagging. In these cases sampling locations were selected in suitable locations based on station descriptions and station photos from previous sampling events. Alternate sampling locations were documented using a handheld GPS in the field.

Field measured water temperatures during sampling ranged from 0.5°C to 7.5°C. Specific conductivity in the field ranged from 13 to 3,248 µS/cm and pH ranged from 5.37 to 8.17. 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, chromium, copper, iron, lead, selenium, and zinc. The V20A station was the only station without any exceedances, as all other stations had exceedances in at least two parameters. The NWID station had the highest number of exceedances in all metals listed above. 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.

It is recommended that all stations be well marked with flagging and station names where none previously existed. This may be done by crews during the next sampling event.



AUTHORSHIP

This report was prepared by EDI Environmental Dynamics Inc. EDI staff who contributed to this report include:

Meghan Marjanovic, B.Sc., R.P.Bio., P.Biol. Primary Author

Meighan Kearns, B.Sc., R.P.Bio., P.Biol..... Senior Review

Matt Power, A.Sc.T GIS Manager

Field work was conducted by Meghan Marjanovic and Brodie Smith of EDI.



TABLE OF CONTENTS

1	INTRODUCTION	1
2	METHODOLOGY	4
2.1	SAMPLING LOCATIONS	4
2.2	FIELD METHODOLOGY	6
2.3	LABORATORY ANALYSIS	6
2.4	QA/QC PROGRAM.....	8
2.5	DATA ANALYSIS	9
3	RESULTS.....	11
3.1	FIELD AND LAB ANALYSIS RESULTS	11
3.2	QA/QC RESULTS	14
4	RECOMMENDATIONS.....	15
5	REFERENCES.....	16
5.1	SPATIAL DATA.....	16

LIST OF APPENDUCES

- APPENDIX A SITE PHOTOGRAPHS**
- APPENDIX B EDI FIELD DATA SHEETS**
- APPENDIX C LABORATORY ANALYSIS SUMMARY TABLE**
- APPENDIX D QA/QC RESULTS SUMMARY**
- APPENDIX E ALS CERTIFICATE OF ANALYSIS**

LIST OF TABLES

Table 1.	Summary of 2013 Faro Pelly River Aquatics Program surface water quality station locations, June 2013.....	2
Table 2.	Alternate station rationale and descriptions, June 2013.....	4



Table 3. Stations where sampling locations were based on 2012 program photos, the field map and/or the station description provided.....5

Table 4. List of parameters selected for laboratory analysis for the Faro Pelly River Aquatics Program. 6

Table 5. QA/QC assessment categories and results.....9

Table 6. List of applicable CCME guidelines for Aquatic Life (continues to next page).9

Table 7. Applicable Faro Effluent Quality Standards for the Faro Mine Complex..... 10

Table 8. Summary of CCME Guideline or Faro Effluent Standard parameter exceedances, June 2013. 12

Table 9. Summary of in situ water quality parameters from June 4-6, 2013..... 13

LIST OF FIGURES

Figure 1. Faro Pelly River Aquatics Program Surface Water Monitoring Stations, June 2013.....3



1 INTRODUCTION

The 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 spring sampling event, conducted from June 4 to June 6, 2013. The summer and fall trips are scheduled for August 2013 and October 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 spring field visit, including duplicate samples, a field blank and a travel blank.

Water levels were high at all sites during the June sampling event, and alternate sampling locations were required for some stations, particularly on the Pelly River and Anvil Creek, where normal helicopter landing sites were flooded. Several other stations appeared to have inaccurate geographic coordinates, and EDI field crews selected sampling locations based on station photographs from the 2012 program, station location descriptions, and/or the field map provided.

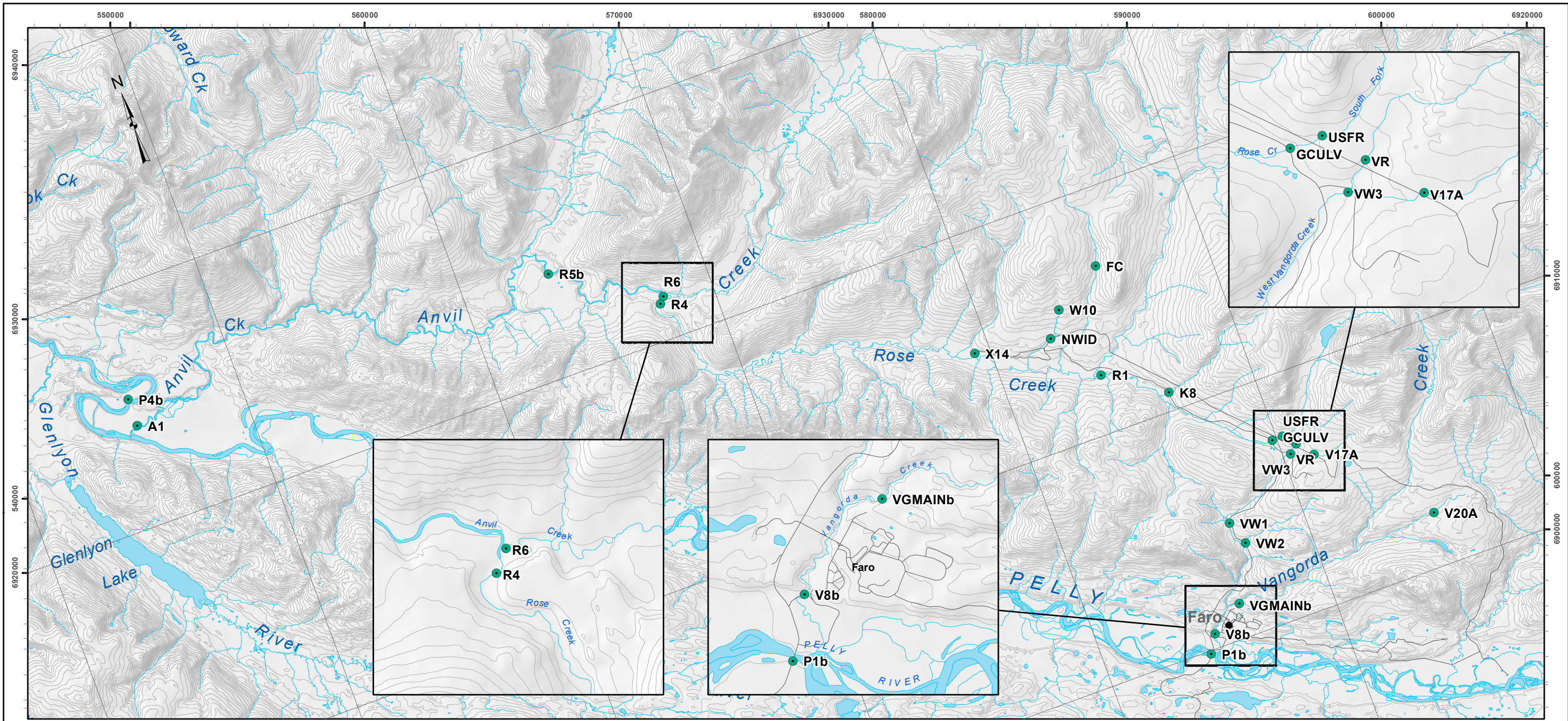


Faro Pelly River Aquatics Program: June 4-6, 2013 Field Report

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

Station Name ⁽¹⁾	UTM Coordinates ⁽²⁾		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
P1b	584342	6899836	Pelly River u/s of Vangorda Creek ⁽³⁾	Reference
P4b	545359	6925383	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
R5b	563703	6924300	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
V8b	584785	6900600	Lower Vangorda Creek at the footbridge	Receiving
VGMAINb	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⁾ Alternate sampling locations are denoted with a 'b'; ⁽²⁾ UTM coordinates in NAD 83 datum, Zone 8V. ⁽³⁾ 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: June 2013

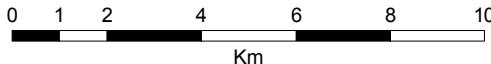
- Legend**
- Water Quality Monitoring Station
 - Robert Campbell Highway
 - Access Road

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.

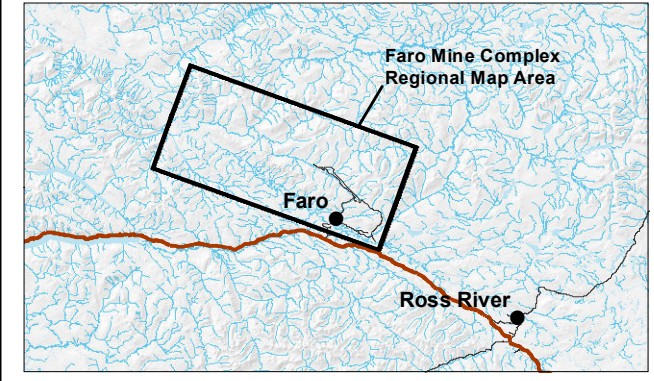
Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2013) was obtained using Garmin GPS technology.

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 = 1:120,000 (printed on 11 x 17)
 Map Projection: North American Datum 1983 UTM Zone 8N

Drawn: MP	Checked: MM	Overview	Date: 20/08/2013
--------------	----------------	----------	------------------





2 METHODOLOGY

Two EDI field crew members conducted the spring surface water quality program from June 4 to 6, 2013 at the Faro Mine Complex and surrounding area. The following sections outline details on the specific sampling locations, field methodology, laboratory analysis, QA/QC program, and data analysis conducted under this program.

2.1 SAMPLING LOCATIONS

Several stations were accessed by helicopter, including P4, A1, R4, R5, R6, V20A, and FC. The remaining stations were accessed by vehicle with a relatively short walk on foot to the sampling location.

As mentioned in Section 1, several alternate sampling locations were selected in the field due to high water. These alternate locations were sampled at sites as close to possible as the original station, while still meeting requirements as a reference or receiving environment (Table 2). In addition, some stations had inaccurate GPS coordinates or vague sampling location descriptions and were poorly marked in the field (Table 3). EDI field crews selected alternate sampling locations based on station photographs from the 2012 program, station location descriptions, and the field map provided.

Table 2. Alternate station rationale and descriptions, June 2013.

Station	Rationale & Alternate Sampling Location Description
P1	<ul style="list-style-type: none"> - No safe landing spot due to high water. - Helicopter flew area to locate a potential alternate landing location, but all banks and gravel bars within a reasonable distance of original station location were flooded. - The only suitable and accessible location was determined to be from the upstream side of the Pelly River Bridge on the left downstream bank. This location was accessed on foot, and it was felt this location was not influenced by water from Vangorda Creek, entering the river directly across on right bank. This sampling location is denoted as P1b.
P4	<ul style="list-style-type: none"> - No safe landing spot due to high water. - Helicopter flew to the next available landing location downstream of the station waypoint. This was an opening along the left downstream bank on a bend in the river. This sampling location is denoted as P4b.
R5	<ul style="list-style-type: none"> - No suitable landing location for station. - Found suitable location 200 m downstream from R5 waypoint with sufficient distance from the Rose Creek confluence to guarantee full mixing. This sampling location is denoted as R5b.



Table 3. Stations where sampling locations were based on 2012 program photos, the field map and/or the station description provided.

Station	Rationale & Alternate Sampling Location Description
GCULV	<ul style="list-style-type: none"> - Station waypoint provided appeared to be inaccurate. Used map, 2012 program photos, and station description to locate a suitable sampling location. - Accessed from Mine Access Road, sampled approximately 10 m upstream from culvert on left downstream bank.
USFR	<ul style="list-style-type: none"> - Station waypoint provided appeared to be inaccurate. Used map, 2012 program photos, and station description to locate a suitable sampling location. - Accessed from Haul Road, sampled approximately 60 m upstream from culvert on right downstream bank.
VGMAIN	<ul style="list-style-type: none"> - Station waypoint provided appeared to be inaccurate. Used station description to locate a suitable sampling location that was easily accessible as the Main Fork of Vangorda Creek is within a deeply incised valley with steep slopes/cliffs on either side. - Used Van Gorder Falls hiking trail and sampled upstream from footbridge, this location was easily accessible and was upstream of West Vangorda Creek confluence. This sampling location is denoted as VGMAINb.
V8	<ul style="list-style-type: none"> - Station waypoint provided led to bridge location at road crossing of creek where there was a sign marked with 'V8'. Samples were collected here; however, upon later review it appeared the V8 water quality station was further upstream accessed from a footbridge off of a 4x4 road. The June 2013 sampling location is denoted as V8b.
VW3	<ul style="list-style-type: none"> - Station waypoint provided appeared to be inaccurate as 2012 program photos showed sampling location downstream of culvert and waypoint appeared to be some distance off actual creek. - Used station description and 2012 program photos to locate a suitable sampling location, sampled 50 m downstream of culvert.
K8	<ul style="list-style-type: none"> - Station waypoint provided appeared to be inaccurate, as waypoint directed to a point some distance from actual creek crossing along Mine Access Road. - Used station description and previous program station photos to sample upstream of the culvert road crossing.
NWID	<ul style="list-style-type: none"> - Station waypoint brought to a slightly different location than shown in photos. No flagging or site markings were found in area. - Sampled from waypoint location which appeared to meet requirements.



2.2 FIELD METHODOLOGY

Water samples were collected at each site for laboratory analysis, along with in situ field data, photo documentation, and geographic coordinate information. A YSI ProPlus multi-meter 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 each field day. Field data was recorded on standard field datasheets including station name, sample identifier, sample date and time, water temperature, specific conductivity, pH, photo numbers and a record of site conditions including flow stage(low, regular, high), turbidity (clear, low, moderate, high), and any other observations. Geographic coordinates were collected where alternate sampling locations were selected, due to high water, safety concerns, or inaccurate sample location information.

Laboratory-cleaned bottles were filled using standard techniques (i.e. nitrile gloves, appropriate bottle handling) and samples were filtered and preserved on site, 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.

2.3 LABORATORY ANALYSIS

All surface water quality laboratory analysis was conducted by ALS. Parameters analyzed included routine, organics, nutrients, and metals. A complete list of parameters is included below in Table 4 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, Appendix B).

Table 4. List of parameters selected for laboratory analysis for the Faro Pelly River Aquatics Program (table continues to next page).

Parameters for Laboratory Analysis	Units	Minimum Detection Limit	Preferred Detection Limit
Miscellaneous 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



Parameters for Laboratory Analysis	Units	Minimum Detection Limit	Preferred Detection Limit
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
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



2.4 QA/QC PROGRAM

Several QA/QC measures were employed during the spring 2013 sampling visit, including two duplicate samples, a field blank sample and a trip blank sample.

- Duplicate samples are essentially sample replicates collected at the same date, time and location as the regular sample. All sampling methodology is the same, as if it is a separate site. Duplicates were collected from two sites, randomly selected on the June 2013 trip. The duplicate samples were conducted to check the accuracy and precision of the laboratory analysis 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 staff to and from site during the field work. The travel blank was not opened at any time during the trip. The purpose of including a travel blank is to identify any contamination of the sample caused during transportation or storage.

Following receipt of the laboratory analysis results, a review of the QA/QC sample results was completed 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 5 for a summary of how QA/QC results are assessed.



Table 5. 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.

2.5 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 6), and with the Effluent Quality Standards for the Faro Mine Complex (Table 7).

Table 6. List of applicable CCME guidelines for Aquatic Life (table continues to next page).

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	-
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 = $e^{0.8545(\text{LN}[\text{hardness}]-1.465)}/1000$
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



Water Quality Parameter	CCME AL Guideline	Comments
		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 7. Applicable Faro Effluent Quality Standards 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 high during the June 4 to 6, 2013 sampling event with moderate to high turbidity levels at most stations. Water temperatures ranged from 0.5°C to 7.5°C (Table 9). Specific conductivity ranged from 13 $\mu\text{S}/\text{cm}$ to 3,248 $\mu\text{S}/\text{cm}$ and pH ranged from pH 6.50 to pH 8.17. Field datasheets are provided in Appendix B. Laboratory analysis results for the surface water samples were compared to both CCME Aquatic Life Guidelines (CCME 2013) and the Faro Effluent Quality Standards. There were exceedances of several parameters, including total suspended solids (TSS), fluoride (F), aluminum (Al), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), selenium (Se), and zinc (Zn). 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 guideline and/or standard exceedances is provided in Table 8. All lab analysis results are further summarized in Appendix C with exceedances highlighted with the Lab Certificate of Analysis provided in Appendix D.

The V20A station was the only station without any exceedances. Conversely the NWID station had exceedances in numerous metals, including Al, Cd, Cr, Cu, Fe, Pb, Se and Zn in addition to TSS. Several of the reference stations had exceedances likely attributed to the mineralization in the local area (e.g. FC, R1, USFR, W10 stations). 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 8. Summary of CCME Guideline or Faro Effluent Standard parameter exceedances, June 2013.

Station ID	Guideline/Standard Exceedances									
	TSS	F	Al	Cd	Cr	Cu	Fe	Pb	Se	Zn
A1	X	-	X	X	X	X	X	X	-	-
FC	-	-	X	X	-	X	X	X	-	-
GCULV	X	-	X	X	X	X	X	X	-	-
K8	-	-	X	X	-	X	-	X	-	-
NWID	X	-	X	X	X	X	X	X	X	X
P1b	X	-	X	X	X	X	X	-	-	X
P4b	X	-	X	X	X	X	X	X	-	X
R1	X	-	X	X	X	X	X	X	-	-
R4	X	-	X	X	X	X	X	X	-	-
R5b	X	-	X	X	X	X	X	X	-	-
R6	X	-	X	X	X	X	X	X	-	-
USFR	-	-	X	X	-	X	X	X	-	-
V17A	-	-	X	X	-	X	X	X	-	X
V20A	-	-	-	-	-	-	-	-	-	-
V8b	X	-	X	X	X	X	X	X	-	X
VGMAINb	-	-	X	X	-	-	X	-	-	-
VR	-	-	X	X	-	X	-	-	-	-
VW1	X	-	X	X	X	X	X	X	-	-
VW2	-	X	-	X	-	-	-	-	X	-
VW3	-	-	X	X	-	X	X	X	-	X
W10	-	-	X	X	-	X	X	-	-	-
X14	X	-	X	X	X	X	X	X	-	-

Where, '-' indicates no exceedance and 'X' indicates an exceedance.



Table 9. Summary of in situ water quality parameters from June 4-6, 2013.

Site	Sample Date (yy-mm-dd)	Time (hh:mm)	Water Temp (°C)	SPC (µS/cm)	pH	Site Conditions
A1	13-Jun-04	09:19	4.4	97.7	6.65	Water level high, high turbidity
FC	13-Jun-04	11:58	1.8	13.0	6.67	Water level high, moderate turbidity
GCULV	13-Jun-05	14:46	2.5	25.6	6.85	Water level high, moderate turbidity
K8	13-Jun-04	17:11	2.8	30.4	6.71	Water level high (bankfull), low turbidity
NWID	13-Jun-04	14:53	5.9	3248	7.01	Water level high, low to moderate turbidity
P1b	13-Jun-06	09:49	7.3	177.7	7.55	Water level high, high turbidity
P4b	13-Jun-04	09:37	7.5	167.5	6.63	Water level high, high turbidity
R1	13-Jun-04	16:41	4.5	77.3	7.01	Water level high (bankfull), moderate turbidity
R4	13-Jun-04	10:50	3.2	102.3	7.21	Water level high, moderate to high turbidity
R5b	13-Jun-04	11:19	3.5	104.0	7.47	Water level high, moderate to high turbidity
R6	13-Jun-04	10:15	3.4	109.1	6.50	Water level high, moderate turbidity
USFR	13-Jun-05	13:46	2.4	24.6	6.82	Water level high, turbidity light to moderate
V17A	13-Jun-05	12:48	2.0	92.6	6.58	Water level high, clear water with slight brown/orange staining
V20A	13-Jun-04	12:27	5.6	289.2	6.98	Water level high, vegetation flooded, turbidity low
V8b	13-Jun-05	16:00	4.5	233.2	7.91	Water level moderate to high, high turbidity (grey-brown colour)
VGMAINb	13-Jun-06	09:14	3.0	235.6	7.49	Water level high, low to moderate turbidity
VR	13-Jun-05	13:14	0.9	30.5	6.55	Water level high, water clear with light- brown staining
VW1	13-Jun-05	15:21	2.8	196.0	7.66	Water level high, high turbidity (milky brown-grey)
VW2	13-Jun-05	15:35	2.2	532.9	8.17	Moderate water level, clear water
VW3	13-Jun-05	08:34	0.5	90.8	6.63	Water level moderate to high, water clear with light-brown staining
W10	13-Jun-04	15:30	2.1	49.0	7.28	Water level high, water clear with slight brown staining
X14	13-Jun-04	14:21	3.4	111.0	6.92	Water level high, moderate turbidity



3.2 QA/QC RESULTS

Duplicate samples were collected at stations V17A and K8. 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 3.0% for the V17A sample and duplicate and 8.6% for the K8 sample and duplicate. For both samples the RPD for the TSS was greater than 20% different for the V17A set and greater than 50% for the K8 set. Some variability is expected during periods of high flow when there is natural variability over often minute timescales, particularly for TSS which can fluctuate frequently. For other parameters, the V17A set was considered adequately precise, except for phosphorous (RPD 29.9%) and iron-dissolved (RPD 28.2%). The K8 set was adequately precise for all other parameters, except zinc-dissolved, which had an RPD of 90.2%. This indicates an error in that particular result.

Travel blank and field blank results are all within acceptable levels. There are no indications of contamination (Appendix D).



4 RECOMMENDATIONS

Sampling was conducted successfully during the Faro Pelly River Aquatics Program spring 2013 sampling event. All stations were sampled, albeit in some cases from an alternate sampling location due to high water and lack of suitable helicopter landing locations; where EDI made every effort to select alternate sampling locations as close as possible to original location and that met requirements as a receiving or reference station. On subsequent visits if conditions allow, samples will be collected from the original sampling locations.

EDI also noted several stations where the station waypoints provided appeared to be incorrect and where stations were poorly marked. In these cases, EDI used all resources available to locate stations, such as maps, station descriptions and station photos from the 2012 program. It is recommended that all sampling locations be marked adequately for subsequent trips; this may involve adding flagging or markers labelled with station identifiers.



5 REFERENCES

- Canadian Council Ministers of the Environment (CCME). Canadian Environmental Quality Guidelines Summary Table. <http://st-ts.ccme.ca/>, accessed June 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. Accessed at http://www.env.gov.bc.ca/epd/wamr/labsys/field_man_pdfs/fld_man_03.pdf
- 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.

This page is intentionally blank.



**APPENDIX A SITE PHOTOGRAPHS,
JUNE 4-6, 2013**

This page is intentionally blank.



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 across stream to right downstream bank.



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 downstream from 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 across to ponded area and outlet stream flowing to the left.



Rose Creek Watershed Stations



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



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



Anvil Creek Stations & Reservoir Creek Station



Photo 17. Anvil Creek upstream from confluence with Pelly River (**A1**), view from helicopter looking at sampling location (gravel bar partly submerged).



Photo 18. Sampled Anvil Creek downstream of confluence with Rose Creek (**R5**) at a location downstream from original station waypoint (**R5b**) due to limited helicopter landing sites. View from helicopter looking downstream towards sampling location (on left downstream bank).



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



Photo 21. No safe helicopter landing locations for sampling the Pelly River station upstream of Vangorda Creek confluence (**P1**), all gravel bars and banks are flooded.



Photo 22. Accessed suitable sampling location for Pelly River station **P1**, from upstream side of bridge, left downstream bank (**P1b**). Photo view looking upstream towards sampling location.



Photo 23. No safe helicopter landing locations for sampling the Pelly River station downstream of Anvil Creek confluence (**P4**), gravel bar flooded.



Photo 24. Closest suitable sampling location for Pelly River station **P4**, at location further downstream (**P4b**). Photo view of left downstream bank where sampling occurred.



**APPENDIX B EDI FIELD DATA SHEETS,
JUNE 4-6, 2013**

This page is intentionally blank.



Project No.: 13-Y-0167
 Project Name: Mount Nansen Water Quality

Weather: Sunny, windy,
15°C

Field Samplers: MM
BSM

Page 1 of 6

YSI Calibration Performed? Yes / No

Date / Time: _____

Site Information		Site Information	
Site Name:	A1 ↑ Anvil Creek	Site Name:	P4 ↑ Pelly River
Sample Identifier:	A1	Sample Identifier:	P4
Sample Date and Time:	4-June-13, 09:19	Sample Date and Time:	4-June-13 9:37
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	4.4°C	Temperature:	7.5°C
Specific Conductivity (SPC):	97.7	Specific Conductivity (SPC):	167.5
pH:	6.65	pH:	6.65
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	high	turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes		Notes	
(if pit incl. DO and ice thickness)	water levels extremely high.	(if pit incl. DO and ice thickness)	could not land on sand bar at P4 - underwater; landed further d/s wpt. P-4; site in a back eddy of river
Photo Numbers		Photo Numbers	
Datasheet:	0108	Datasheet:	0118
Downstream:	0107	Downstream:	0119
Upstream:	0106	Upstream:	0115
Overview:	0109	Overview:	0116-0117

Aerial 0110-111

Site Information		Site Information	
Site Name:	R6 Anvil Ck vs Rose Ck	Site Name:	P4 Rose Ck vs Anvil Ck
Sample Identifier:	R6	Sample Identifier:	P4
Sample Date and Time:	4-June-13 10:15	Sample Date and Time:	4-June-13 10:50
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	3.4	Temperature:	3.2
Specific Conductivity (SPC):	109.1	Specific Conductivity (SPC):	102.3
pH:	6.5	pH:	6.5 7.21
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	moderate	turbidity (clear, light, mod, high):	mod. to high
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes		Notes	
(if pit incl. DO and ice thickness)	really high water, flooding vegetation	(if pit incl. DO and ice thickness)	vegetation flooded
Photo Numbers		Photo Numbers	
Datasheet:	0125	Datasheet:	0132
Downstream:	0124	Downstream:	0130
Upstream:	0123	Upstream:	0131
Overview:	0126-0127	Overview:	0133

Field Blank ID _____
 Trip Blank ID _____



Project No.: 13-Y-0199
 Project Name: Faro Surface Water Quality
 Page 2 of 6

Weather: cloudy, 12°C
windy

Field Samplers: Bsm
MM

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

Site Information		Site Information	
Site Name:	RS - Arvil ck dli Rose ck	Site Name:	FC - Faro ck above Diversion channel
Sample Identifier:	RS	Sample Identifier:	FC
Sample Date and Time:	4-June-13 11:19	Sample Date and Time:	4-June-13, 11:58
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	3.5°C	Temperature:	1.8°C
Specific Conductivity (SPC):	104.0	Specific Conductivity (SPC):	13.0
pH:	7.47	pH:	6.67
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	mod-high	turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes		Notes	
(if pit incl. DO and ice thickness)	unable to land at side - underwater wpt R-5 found site further dli.	(if pit incl. DO and ice thickness)	
Photo Numbers		Photo Numbers	
Datasheet:	0135	Downstream:	0133
Upstream:	0134	Overview:	0136
Datasheet:	0147	Downstream:	0146
Upstream:	0145	Overview:	0148

Site Information		Site Information	
Site Name:	V20A Dixon ck ^{4 1/2 mi}	Site Name:	X14 - Rose ck dli diversion
Sample Identifier:	V20A	Sample Identifier:	X14
Sample Date and Time:	4-June-13 12:27	Sample Date and Time:	4-June-13, 14:21
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	5.6	Temperature:	3.4
Specific Conductivity (SPC):	289.2	Specific Conductivity (SPC):	111.0
pH:	6.98	pH:	6.92
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	low	turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes		Notes	
(if pit incl. DO and ice thickness)	Some vegetation flooded.	(if pit incl. DO and ice thickness)	vegetation flooded.
Photo Numbers		Photo Numbers	
Datasheet:	0155	Downstream:	0151-0152
Upstream:	0150	Overview:	0154
Datasheet:	0192	Downstream:	0190
Upstream:	0191	Overview:	0189

Field Blank ID _____
 Trip Blank ID _____



Project No.: 13-Y-0199

Weather: overcast 9°C
partly sunny
light breeze

Field Samplers: MM, BSM

Project Name: Faro Surface Water Quality

Page 3 of 6

YSI Calibration Performed? Yes / No

Date / Time: 8AM - June 6, 2013

Site Information		Site Information	
Site Name:	<u>VW2</u>	Site Name:	<u>P1 Belly River</u>
Sample Identifier:	<u>VW2</u>	Sample Identifier:	<u>P1</u>
Sample Date and Time:	<u>June 5 2013 15:35</u>	Sample Date and Time:	<u>June 6, 2013 9:49</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>2.2</u>	Temperature:	<u>7.3</u>
Specific Conductivity (SPC):	<u>532.9</u>	Specific Conductivity (SPC):	<u>177.7</u>
pH:	<u>8.17</u>	pH:	<u>7.55</u>
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	<u>mod, evidence of higher flows</u>	flow level:	<u>high, all gravel bars + veg submerged</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>high (milky brown-green)</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>sample site w/ of culvert w/om.</u>		(if pit incl. DO and ice thickness) <u>sampled w/ of bridge, should not have any influence from Vangorda Ck on other bank. Wpt P-1A, DI from actual P1 site.</u>	
wpt V-W2. same as photo + 20m from other wpt.			
Photo Numbers		Photo Numbers	
Datasheet:	<u>7042, 7046</u>	Downstream:	<u>7044</u>
Upstream:	<u>7043</u>	Overview:	<u>7045</u>
Datasheet:	<u>7064, 7068</u>	Downstream:	<u>7066</u>
Upstream:	<u>7067, 7069</u>	Overview:	<u>7065, 7070</u>

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

* P1 small amber bottle filled w/ unfiltered water on mistake. dumped out + rinsed w/ filtered water. then filled w/ filtered water.

Field Blank ID _____

Trip Blank ID _____

* P1 + VGMAIN were not preserved in field as there were missing preservatives. Preserved on arrival at lab same day. Samples were filtered there.

Project No.: 13-Y-0167

Weather: 5°C cloudy
light-mid
winds

Field Samplers: MJM, BSm

Project Name: Mount Nansen Water Quality

Page 4 of 6

YSI Calibration Performed? Yes / No

Date / Time: June 5, 2013

Site Information		Site Information	
Site Name:	<u>G-CULV</u>	Site Name:	<u>VW1</u>
Sample Identifier:	<u>G-CULV</u>	Sample Identifier:	<u>VW1</u> <u>15121</u>
Sample Date and Time:	<u>June 5, 2013</u> <u>14:46</u>	Sample Date and Time:	<u>June 5, 2013</u> <u>15:21</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>2.5</u>	Temperature:	<u>2.8</u>
Specific Conductivity (SPC):	<u>25.6</u>	Specific Conductivity (SPC):	<u>196.0</u>
pH:	<u>6.85 6.85</u>	pH:	<u>7.66</u>
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	<u>high</u>	flow level:	<u>high - evidence it had been backfill</u>
turbidity (clear, light, mod, high):	<u>mod.</u>	turbidity (clear, light, mod, high):	<u>high (milky)</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>sampled uls of culvert ~10m. across from gravel bar. GPS point was quite off. Used map + photos. wpt G-CULV.</u>	(if pit incl. DO and ice thickness)	<u>followed Dugs from road down to creek wpt. V-W1. lots of debris</u>
Photo Numbers		Photo Numbers	
Datasheet:	<u>7032, 7033</u>	Downstream:	<u>7033</u>
Upstream:	<u>7034</u>	Overview:	<u>7034</u>
Datasheet:	<u>7041</u>	Downstream:	<u>7038</u>
Upstream:	<u>7037</u>	Overview:	<u>7039-7040</u>

Site Information		Site Information	
Site Name:	<u>V8</u>	Site Name:	<u>V6-MAIN</u>
Sample Identifier:	<u>V8</u>	Sample Identifier:	<u>V6-MAIN</u> <u>9</u>
Sample Date and Time:	<u>June 5, 2013</u> <u>16:00</u>	Sample Date and Time:	<u>June 6, 2013</u> <u>9:14</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>4.5</u>	Temperature:	<u>3.0</u>
Specific Conductivity (SPC):	<u>233.2</u>	Specific Conductivity (SPC):	<u>235.6</u>
pH:	<u>7.91</u>	pH:	<u>7.49</u>
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	<u>mod-high</u>	flow level:	<u>high</u>
turbidity (clear, light, mod, high):	<u>high - grey-brown colour</u>	turbidity (clear, light, mod, high):	<u>mod/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>sampled uls of bridge at wpt + at sign "V8".</u>	(if pit incl. DO and ice thickness)	<u>sampled uls of footbridge. GPS point off, so hiked via trail to creek, uls of Vanguarda (k West). wpt V6-MAIN</u>
Photo Numbers		Photo Numbers	
Datasheet:	<u>7050</u>	Downstream:	<u>7049</u>
Upstream:	<u>7048</u>	Overview:	<u>7051</u>
Datasheet:	<u>7057</u>	Downstream:	<u>7054, 7059</u>
Upstream:	<u>7055, 7058</u>	Overview:	<u>7056</u>

Sign: 7047

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0199

Weather: calm, partly cloudy, +15°C

Field Samplers: MM, BSM

Project Name: Faro Mount Nansen Water Quality

Page 5 of 6

YSI Calibration Performed? Yes No

Date/Time: 8AM June 4, 2013

Site Information		Site Information	
Site Name:	NW1D	Site Name:	W10
Sample Identifier:	NW1D	Sample Identifier:	W10
Sample Date and Time:	June 4, 2013 14:53	Sample Date and Time:	June 4, 2013 15:30
Replicate ID (if applicable)	n/a	Replicate ID (if applicable)	n/a
Field Measured Parameters		Field Measured Parameters	
Temperature:	5.9	Temperature:	2.1
Specific Conductivity (SPC):	3248	Specific Conductivity (SPC):	49.0
pH:	7.01	pH:	7.28
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	low-mod.	turbidity (clear, light, mod, high):	clear (slight br. staining)
ice thickness (if applicable)	no ice	ice thickness (if applicable)	no ice
Notes		Notes	
(if pit incl. DO and ice thickness) high water, water flowing over grass through willows. orang. brown deposit over substrate.		(if pit incl. DO and ice thickness) site has orange sludging, upstream of ponded area.	
Photo Numbers		Photo Numbers	
Datasheet: 6953, 6954	Downstream: 6953	Datasheet: 6957, 62	Downstream: 6957
Upstream: 6952	Overview: 6955, 56	Upstream: 6958	Overview: 6960, 61

NO FLAG FOUND
GPS = NW

Site Information		Site Information	
Site Name:	R1 - South Fork Rose Ck	Site Name:	K8
Sample Identifier:	R1	Sample Identifier:	K8
Sample Date and Time:	June 4, 2013 16:41	Sample Date and Time:	June 4, 2013 17:11
Replicate ID (if applicable)	n/a	Replicate ID (if applicable)	Duplicate #1 17:20
Field Measured Parameters		Field Measured Parameters	
Temperature:	4.5	Temperature:	2.8
Specific Conductivity (SPC):	77.3	Specific Conductivity (SPC):	30.4
pH:	7.01	pH:	6.5 6.71
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high - bankfull	flow level:	high - bankfull
turbidity (clear, light, mod, high):	mod	turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	none	ice thickness (if applicable)	none
Notes		Notes	
(if pit incl. DO and ice thickness) Access on foot from main Road (mine access Rd). 400m. Could use helicopter nest thru large gravel pit opening		(if pit incl. DO and ice thickness) Access from mine road - 20m culvert.	
Photo Numbers		Photo Numbers	
Datasheet: 6963, 64	Downstream: 6965	Datasheet: 6969	Downstream: 6970
Upstream: 6964	Overview: 6966	Upstream: 6971	Overview: 6972

Field Blank ID _____
Trip Blank ID _____

Access - 6966



Project No.: 13-Y-0199

Project Name: Faro Surface Water Quality

Page 6 of 6

Weather: Sunny, moderate winds 6°C

Field Samplers: MW, BSM

YSI Calibration Performed? Yes No

Date / Time: June 5, 2013 7:45AM

Site Information		Site Information	
Site Name:	VW3	Site Name:	V17A
Sample Identifier:	VW3	Sample Identifier:	V17A
Sample Date and Time:	June 5, 2013 8:34	Sample Date and Time:	June 5, 2013 12:48
Replicate ID (if applicable)		Replicate ID (if applicable)	Duplicate #2 12:48
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.5	Temperature:	2.0
Specific Conductivity (SPC):	90.8	Specific Conductivity (SPC):	92.6
pH:	6.63	pH:	6.56
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	moderate - high	flow level:	high, grass under water
turbidity (clear, light, mod, high):	clear, light brown staining	turbidity (clear, light, mod, high):	clear, slight brown/orange stain
ice thickness (if applicable)	none	ice thickness (if applicable)	no ice
Notes		Notes	
(if pit incl. DO and ice thickness)	wet VW-3. GPS point off from actual ok. photo shows just off side road. Took sample in 50m ditch culvert	(if pit incl. DO and ice thickness)	sampled from rebar stake. waypoint was right on.
Photo Numbers		Photo Numbers	
Datasheet:	6976, 73	Datasheet:	7020 + 17
Upstream:	6974	Upstream:	7018
Downstream:	6975	Downstream:	7019
Overview:	6977-78	Overview:	7020

Site Information		Site Information	
Site Name:	VR	Site Name:	USFR
Sample Identifier:	VR	Sample Identifier:	USFR
Sample Date and Time:	June 5, 2013 13:14	Sample Date and Time:	June 5, 2013 13:46
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.9	Temperature:	2.4
Specific Conductivity (SPC):	30.5	Specific Conductivity (SPC):	24.6
pH:	6.55	pH:	6.82
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:	high, veg flooded	flow level:	high
turbidity (clear, light, mod, high):	clear, light brown staining	turbidity (clear, light, mod, high):	low to mod
ice thickness (if applicable)	none	ice thickness (if applicable)	
Notes		Notes	
(if pit incl. DO and ice thickness)	wet right, sampled.	(if pit incl. DO and ice thickness)	wet US-FR. sampled ~ 600m turbulent, fast flow. W/S of culvert
Photo Numbers		Photo Numbers	
Datasheet:	7022, 27	Datasheet:	7031
Upstream:	7024	Upstream:	7028
Downstream:	7023	Downstream:	7029
Overview:	7025 - 7026	Overview:	7030

Field Blank ID FIELD BLANK 13:32

Trip Blank ID TRAVEL BLANK



**APPENDIX C LABORATORY ANALYSIS
SUMMARY TABLE,
JUNE 4-6, 2013**

This page is intentionally blank.



Table C-1. Water Quality Parameter Guideline Exceedances; June 4-6, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	V8	V17A	V20A	VR	VGMAIN	VW1	VW2	VW3	FC	R1	R4
				Date Sampled Time	05-Jun-13 16:00	05-Jun-13 12:48	04-Jun-13 12:27	05-Jun-13 13:14	06-Jun-13 9:14	05-Jun-13 15:21	05-Jun-13 15:35	05-Jun-13 8:34	04-Jun-13 11:58	04-Jun-13 16:41	04-Jun-13 10:50
				Detection Limit											
Temperature (in-situ)	°C	-	-	-	4.5	2.0	5.6	0.9	3.0	2.8	2.2	0.5	1.8	4.5	3.2
Specific Conductivity (in-situ)	µS/cm	-	-	-	233.2	92.6	289.2	30.5	235.6	196.0	532.9	90.8	13.9	77.3	102.3
pH (in-situ)	-	6.5 - 9.0	6.5	-	7.91	6.58	6.98	6.55	7.49	7.66	8.17	6.63	6.67	7.01	7.21
Hardness (as CaCO3)	mg/L	-	-	0.5	114	40.7	143	12.9	110	94.5	253	39.9	4.89	34.5	46
pH (lab)	pH	6.5 - 9.0	6.5	0.1	8.17	7.68	8.2	7.06	8.14	8.18	8.49	7.94	7.11	7.87	7.90
Total Suspended Solids	mg/L	-	15	1.0	110	6.5	<1.0	1.7	6.2	133	1.4	9.5	12	62.3	19
Total Dissolved Solids	mg/L	-	-	3.0	149	75.7	160	38.8	145	128	327	72.7	27	56.1	72.2
Alkalinity Total	mg/L	-	-	2.0	-	-	-	10	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	84.1	22.4	151	-	76.8	80.1	217	28.4	4.4	32.2	35.9
Ammonia, Total (as N)	mg/L	-	1.3	0.005	<0.0050	0.0067	<0.0050	0.0068	<0.0050	0.0067	<0.0050	<0.0050	0.0129	0.007	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.091	0.079	0.107	0.066	0.076	0.115	0.147	0.072	0.04	0.059	0.06
Nitrate (as N)	mg/L	3.0	-	0.005	0.0823	0.0702	<0.0050	<0.0050	0.0913	0.0621	0.319	0.0518	<0.0050	0.0193	0.0285
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	0.12	0.0215	0.0102	0.0087	0.0119	0.198	0.0155	0.0174	0.0283	0.515	0.0343
Sulfate (SO4)	mg/L	-	-	0.5	41.5	20.2	6.81	2.34	46.4	22.9	74.4	15.6	<0.50	6.25	14.3
Dissolved Organic Carbon	mg/L	-	-	0.5	6.42	8.62	7.42	8.18	6.76	7.99	5.59	8.29	9.02	6.52	6.68
Total Organic Carbon	mg/L	-	-	0.5	6.35	8.53	7.48	8.5	6.19	9.4	5.43	10.3	9.53	8.5	6.78
Aluminum (Al)-Total	mg/L	0.1	-	0.003	2.64	0.232	0.0054	0.103	0.198	2.33	0.0395	0.305	0.421	1.87	0.599
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	0.00031	<0.00010	<0.00010	<0.00010	<0.00010	0.00032	0.00022	<0.00010	<0.00010	<0.00010	0.00015
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.00334	0.00135	0.0005	0.00034	0.0007	0.00333	0.00062	0.00121	0.00033	0.00167	0.00098
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0957	0.017	0.0914	0.0148	0.0336	0.0722	0.0909	0.0221	0.0142	0.0488	0.0495
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	0.00017	<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	-	0.02	0.00001	0.00015	0.000041	<0.000010	0.00002	0.000049	0.000099	0.000077	0.00006	0.000031	0.000078	0.000068
<i>Cadmium (Cd)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000037	0.000015	0.000045	0.000006	0.000036	0.000032	0.000074	0.000015	0.000002	0.000013	0.000017
Calcium (Ca)-Total	mg/L	-	-	0.02	29.3	11	38.3	4.15	27.6	26.8	70.2	12.2	1.53	11.5	13.4
Chromium (Cr)-Total	mg/L	0.001	-	0.0001	0.00837	0.00036	0.00012	0.00021	0.00063	0.00598	0.00029	0.00055	0.00069	0.00341	0.00156
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00226	0.00021	<0.00010	<0.00010	0.00021	0.00201	<0.00010	0.00021	0.0002	0.00176	0.00086
Copper (Cu)-Total (Lab Result)	mg/L	-	0.2	0.0005	0.00727	0.00132	<0.00050	0.0013	0.00232	0.00621	0.00108	0.00156	0.00153	0.00487	0.00309
<i>Copper (Cu)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00264	0.00110	0.00321	0.00041	0.00257	0.00225	0.00523	0.00108	0.00018	0.00095	0.00122
Iron (Fe)-Total	mg/L	0.3	-	0.01	4.16	0.329	0.032	0.075	0.373	3.79	0.056	0.387	0.414	3.6	1.08
Lead (Pb)-Total (Lab Result)	mg/L	-	0.2	0.00005	0.00764	0.00231	<0.000050	0.000213	0.00153	0.0132	0.000117	0.00146	0.00362	0.00414	0.00624
<i>Lead (Pb)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.003759	0.001013	0.005016	0.000235	0.003592	0.002961	0.010371	0.000988	0.000068	0.000821	0.001184
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00458	0.00067	0.00195	<0.00050	0.00161	0.00604	0.00271	0.00066	0.00083	0.00393	0.0017
Magnesium (Mg)-Total	mg/L	-	-	0.005	12.3	2.84	11.9	0.783	10.5	7.1	28.7	3.12	0.392	2.78	3
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.0996	0.023	0.0104	0.00195	0.0166	0.0917	0.0011	0.0167	0.0108	0.103	0.294
Molybdenum (Mo)-Total	mg/L	0.073	0.5	0.00005	0.000763	0.00009	0.000285	0.000096	0.000416	0.000717	0.00193	0.0001	0.00005	0.000213	0.000332
Nickel (Ni)-Total (Lab Result)	mg/L	-	0.5	0.0005	0.0109	0.00099	<0.00050	0.00059	0.0014	0.00702	0.00115	0.00102	0.0009	0.00424	0.0029
<i>Nickel (Ni)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.10558	0.04827	0.12543	0.02016	0.10276	0.09155	0.19352	0.04754	0.00964	0.04257	0.05297
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	1.25	0.41	0.792	0.444	0.843	0.835	1.02	0.497	0.778	1.06	0.963
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	0.00062	<0.00010	0.00035	<0.00010	0.00032	0.00041	0.00215	<0.00010	<0.00010	0.00012	0.00021
Silicon (Si)-Total	mg/L	-	-	0.05	8.14	3.49	4.07	3.15	3.52	7.77	3.91	3.62	1.96	4.54	3.11
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000052	0.000022	<0.000010	0.000016	0.000011	0.000059	<0.000010	0.000014	0.000017	0.000021	0.000028
Sodium (Na)-Total	mg/L	-	-	0.05	1.58	0.88	1.38	1.02	1.45	1.32	2.06	1.03	0.573	0.886	0.932
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.122	0.0473	0.194	0.0222	0.112	0.137	0.284	0.0562	0.0111	0.0644	0.0544
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000037	0.00001	<0.000010	<0.000010	<0.000010	0.000076	<0.000010	<0.000010	<0.000010	0.000025	0.000025
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	0.00014	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.071	<0.010	<0.010	<0.010	<0.010	0.045	<0.010	<0.010	0.011	0.063	0.018
Uranium (U)-Total	mg/L	-	-	0.00001	0.00216	0.00104	0.000774	0.000699	0.00235	0.0016	0.00476	0.00107	0.000224	0.00156	0.00049
Vanadium (V)-Total	mg/L	-	-	0.001	0.0076	<0.0010	<0.0010	<0.0010	<0.0010	0.0053	0.0012	<0.0010	<0.0010	0.0038	0.0017
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0319	0.0592	<0.0030	0.0035	0.0174	0.0253	0.0036	0.0513	0.0083	0.0156	0.0185
Zirconium (Zr)-Total	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.003	0.0208	0.0896	0.0038	0.0697	0.0235	0.0226	0.0036	0.0668	0.108	0.0318	0.039



Table C-1. Water Quality Parameter Guideline Exceedances; June 4-6, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	V8	V17A	V20A	VR	VGMAIN	VW1	VW2	VW3	FC	R1	R4
				Date Sampled Time	05-Jun-13 16:00	05-Jun-13 12:48	04-Jun-13 12:27	05-Jun-13 13:14	06-Jun-13 9:14	05-Jun-13 15:21	05-Jun-13 15:35	05-Jun-13 8:34	04-Jun-13 11:58	04-Jun-13 16:41	04-Jun-13 10:50
				Detection Limit											
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.00057	0.00098	0.00052	0.00029	0.0004	0.00084	0.00054	0.00066	0.00013	0.00031	0.00037
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0312	0.0155	0.0935	0.0142	0.0303	0.0356	0.0909	0.0186	0.00928	0.0203	0.0279
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	-	0.02	0.00001	0.000033	0.000024	<0.000010	0.000011	0.000036	0.000021	0.000071	0.000031	0.000022	<0.000010	0.00002
Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00001	0.000037	0.000015	0.000045	0.000006	0.000036	0.000032	0.000074	0.000015	0.000002	0.000013	0.000017
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	27.9	11	38.2	3.99	27.1	24.4	55.2	11.1	1.48	10.5	13.7
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00012	0.00021	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
Copper (Cu)-Dissolved (Lab Result)	mg/L	-	0.2	0.0005	0.00148	0.00126	0.00038	0.00108	0.00181	0.00124	0.00088	0.00111	0.00094	0.00071	0.00147
Copper (Cu)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.00264	0.00110	0.00321	0.00041	0.00257	0.00225	0.00523	0.00108	0.00018	0.00095	0.00122
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.049	0.178	0.025	0.042	0.057	0.08	<0.010	0.089	0.087	0.118	0.102
Lead (Pb)-Dissolved (Lab Result)	mg/L	-	0.2	0.00005	0.000232	0.000315	<0.000050	0.000116	0.000194	0.000263	<0.000050	0.000259	0.00126	0.000098	0.000525
Lead (Pb)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.00005	0.003759	0.001013	0.005016	0.000235	0.003592	0.002961	0.010371	0.000988	0.000068	0.000821	0.001184
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00164	0.0005	0.00205	<0.00050	0.00136	0.00174	0.0021	0.00056	<0.00050	0.00065	0.00093
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	10.7	3.18	11.6	0.722	10.3	8.17	27.9	2.98	0.292	2.01	2.87
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0108	0.0225	0.00847	0.000729	0.00488	0.0236	0.000188	0.00763	0.00361	0.0089	0.0848
Molybdenum (Mo)-Dissolved	mg/L	0.073	0.5	0.00005	0.000579	0.000091	0.000272	0.00008	0.000398	0.000342	0.00145	0.000073	<0.000050	0.000144	0.000249
Nickel (Ni)-Dissolved (Lab Result)	mg/L	-	0.5	0.0005	0.00111	0.00085	<0.00050	<0.00050	0.00095	0.00079	0.001	0.00065	<0.00050	<0.00050	0.00101
Nickel (Ni)-Diss. (Hardness Adjusted Guideline)	mg/L	-	-	0.0005	0.10558	0.04827	0.12543	0.02016	0.10276	0.09155	0.19352	0.04754	0.00964	0.04257	0.05297
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	0.83	0.447	0.792	0.424	0.815	0.719	1.01	0.454	0.725	0.851	0.912
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	0.0006	<0.00010	0.00036	<0.00010	0.00034	0.00032	0.00248	<0.00010	<0.00010	<0.00010	0.00018
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.17	3.33	4.02	3.15	3.23	3.47	3.8	3.28	2.07	2.19	2.4
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	1.53	0.986	1.34	0.964	1.43	1.73	1.99	0.944	0.54	0.807	0.929
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.115	0.0468	0.189	0.021	0.107	0.12	0.22	0.0489	0.0102	0.0546	0.0535
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000038	<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	-	-	0.00001	0.00205	0.000896	0.000737	0.000643	0.00224	0.00137	0.00361	0.000834	0.000171	0.000612	0.000414
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	0.006	0.0627	<0.0010	0.0019	0.0139	0.0075	0.0037	0.0433	0.0051	0.001	0.007
Zirconium (Zr)-Dissolved	mg/L	-	-	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; June 4-6, 2013.

Z

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	R5	R6	W10	X14	NWID	USFR	GCULV	K8	A1	P1	P4
				Date Sampled Time	04-Jun-13 11:19	04-Jun-13 10:15	04-Jun-13 14:53	04-Jun-13 14:21	04-Jun-13 14:53	05-Jun-13 13:46	05-Jun-13 14:46	04-JUN-13 17:11	04-JUN-13 09:19	06-JUN-13 09:49	04-JUN-13 09:37
				Detection Limit											
Temperature (in-situ)	°C	-	-	-	3.5	3.4	2.1	3.4	5.9	2.4	2.5	2.8	4.4	7.3	7.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	104.0	109.1	49.0	111.0	3248.0	24.6	25.6	30.4	97.7	177.7	167.5
pH (in-situ)	-	6.5 - 9.0	6.5	-	7.47	6.50	7.28	6.92	7.01	6.82	6.85	6.71	6.65	7.55	6.63
Hardness (as CaCO3)	mg/L	-	-	0.5	48.7	51.9	23.2	50.7	2040	9.76	10.3	12.9	45.6	84.8	81.9
pH (lab)	pH	6.5 - 9.0	6.5	0.1	7.94	8.03	7.73	7.90	7.56	7.46	7.42	7.46	7.91	8.1	8.12
Total Suspended Solids	mg/L	-	15	1.0	42.7	240	3.9	28	61.5	13.7	38	4.3	119	130	164
Total Dissolved Solids	mg/L	-	-	3.0	70.5	71.9	51.9	74.5	3270	72.7	29.3	28.3	73.7	121	123
Alkalinity Total	mg/L	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	38.8	48.6	21.8	36.3	144	9.2	10.1	11.5	38.8	68.7	65.3
Ammonia, Total (as N)	mg/L	-	1.3	0.005	0.0057	0.0091	<0.0050	0.0087	0.0195	<0.0050	<0.0050	<0.0050	0.0082	<0.0050	0.0055
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.059	0.048	0.08	0.062	<0.40	0.047	0.047	0.044	0.061	0.094	0.089
Nitrate (as N)	mg/L	3.0	-	0.005	0.0302	0.041	<0.0050	0.0185	1.18	<0.0050	0.0067	0.007	0.0327	0.0106	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorous (P), Total	mg/L	-	-	0.002	0.0567	0.193	0.0179	0.0367	0.0145	0.0229	0.0361	0.014	0.166	0.187	0.269
Sulfate (SO4)	mg/L	-	-	0.5	13.1	7.31	2.18	17.6	2220	2.17	2.31	2.29	10.2	28.5	25.1
Dissolved Organic Carbon	mg/L	-	-	0.5	7.13	6.94	9.18	6.41	4.29	4.84	4.97	5.48	7.38	7.49	8.23
Total Organic Carbon	mg/L	-	-	0.5	7.08	9.18	8.19	7.01	5.1	4.8	7.48	4.56	7.61	7.83	9.43
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.953	2.34	0.171	0.575	1.89	0.304	1.06	0.161	2.19	2.1	2.75
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	0.00034	0.00029	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00028	0.00062	0.00073
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.00142	0.00234	0.00036	0.00091	0.0036	0.00039	0.00107	0.00024	0.00275	0.00339	0.0045
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0555	0.0721	0.0102	0.0343	0.0899	0.017	0.0309	0.0124	0.102	0.178	0.221
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	0.00016	<0.00010	<0.00010	<0.0010	<0.00010	0.0001	<0.00010	0.00012	0.00013	0.00016
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	-	0.02	0.00001	0.000117	0.000157	0.000036	0.00005	0.0628	0.000018	0.00005	0.000015	0.000172	0.000451	0.000515
<i>Cadmium (Cd)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000018	0.000019	0.000009	0.000018	0.000443	0.000004	0.000005	0.000006	0.000017	0.000029	0.000028
Calcium (Ca)-Total	mg/L	-	-	0.02	13.8	16.2	7.76	15.3	337	3.25	3.73	4.26	14.9	24.1	24.3
Chromium (Cr)-Total	mg/L	0.001	-	0.0001	0.00225	0.00504	0.0004	0.0015	0.0017	0.00049	0.00164	0.0003	0.00531	0.00426	0.00566
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00116	0.00204	<0.00010	0.0009	0.0608	0.00019	0.00065	<0.00010	0.00186	0.00171	0.00234
Copper (Cu)-Total (Lab Result)	mg/L	-	0.2	0.0005	0.00396	0.00686	0.0027	0.0025	0.118	0.00108	0.00204	0.00089	0.00679	0.00856	0.0109
<i>Copper (Cu)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00128	0.00135	0.00068	0.00132	0.03111	0.00032	0.00034	0.00041	0.00121	0.00205	0.00199
Iron (Fe)-Total	mg/L	0.3	-	0.01	1.62	3.65	0.184	1.07	9.47	0.515	1.6	0.239	3.42	3.76	5.28
Lead (Pb)-Total (Lab Result)	mg/L	-	0.2	0.00005	0.00599	0.00323	0.000899	0.00602	0.172	0.000446	0.00195	0.000572	0.00585	0.00255	0.00363
<i>Lead (Pb)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.001273	0.001381	0.000495	0.001340	0.147844	0.000165	0.000176	0.000235	0.001171	0.002579	0.002467
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00222	0.00459	0.00086	0.00177	0.0282	<0.00050	0.0019	<0.00050	0.00341	0.00339	0.00406
Magnesium (Mg)-Total	mg/L	-	-	0.005	3.28	3.87	1.01	3.54	301	0.57	0.793	0.594	3.89	7.85	7.92
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.311	0.117	0.00329	0.36	7.49	0.025	0.0717	0.00624	0.237	0.125	0.164
Molybdenum (Mo)-Total	mg/L	0.073	0.5	0.00005	0.00108	0.000767	0.000203	0.00028	<0.00050	0.000151	0.00023	0.000051	0.000672	0.00135	0.00148
Nickel (Ni)-Total (Lab Result)	mg/L	-	0.5	0.0005	0.00365	0.00614	0.00092	0.00258	0.201	0.00063	0.00154	<0.00050	0.00738	0.0115	0.014
<i>Nickel (Ni)-Total (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.05532	0.05806	0.03149	0.05704	0.94552	0.01631	0.01699	0.02016	0.05262	0.08432	0.08212
Phosphorus (P)-Total	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<3.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	-	-	0.05	1.02	1.02	0.596	0.984	6.66	0.766	0.893	0.748	1.48	1.36	1.61
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	0.00043	0.00035	<0.00010	0.00015	0.0022	<0.00010	<0.00010	<0.00010	0.00032	0.00092	0.00093
Silicon (Si)-Total	mg/L	-	-	0.05	3.51	6.09	4.41	3.09	6	2.26	3.31	1.62	5.88	5.66	6.71
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000046	0.000049	0.000034	0.000022	0.00017	0.000011	0.00002	<0.000010	0.00005	0.000086	0.000117
Sodium (Na)-Total	mg/L	-	-	0.05	0.995	0.672	1.1	1.08	19.8	0.699	0.772	0.539	1.01	0.918	0.926
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0538	0.054	0.0275	0.0614	1.89	0.0232	0.0263	0.0271	0.0566	0.105	0.102
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000173	0.000043	<0.000010	<0.000010	0.00046	<0.000010	0.000024	<0.000010	0.000046	0.000049	0.000058
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.031	0.069	<0.010	0.017	<0.10	<0.010	0.038	<0.010	0.076	0.037	0.059
Uranium (U)-Total	mg/L	-	-	0.00001	0.000613	0.000964	0.000199	0.000599	0.00415	0.000651	0.00131	0.000555	0.000725	0.000836	0.000863
Vanadium (V)-Total	mg/L	-	-	0.001	0.003	0.0084	<0.0010	0.0015	<0.010	<0.0010	0.0019	<0.0010	0.0075	0.011	0.0136
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0198	0.019	0.0078	0.0171	80.7	0.0035	0.009	0.004	0.0242	0.0469	0.0564
Zirconium (Zr)-Total	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.0080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	0.00104
Aluminum (Al)-Dissolved	mg/L	0.1	-	0.003	0.0399	0.0375	0.0575	0.04	0.012	0.0442	0.0427	0.0484	0.0376	0.0281	0.0285



Table C-1. Water Quality Parameter Guideline Exceedances; June 4-6, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	R5	R6	W10	X14	NWID	USFR	GCULV	K8	A1	P1	P4
				Date Sampled Time	04-Jun-13 11:19	04-Jun-13 10:15	04-Jun-13 14:53	04-Jun-13 14:21	04-Jun-13 14:53	05-Jun-13 13:46	05-Jun-13 14:46	04-JUN-13 17:11	04-JUN-13 09:19	06-JUN-13 09:49	04-JUN-13 09:37
				Detection Limit											
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	<0.00010	0.0001	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	0.00026	0.00027
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.00037	0.00043	0.00028	0.00037	<0.0010	0.00023	0.00022	0.00016	0.00058	0.00065	0.00066
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.028	0.0298	0.009	0.0224	0.0397	0.0122	0.0127	0.0107	0.0276	0.0422	0.041
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<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	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	-	0.02	0.00001	0.000026	0.00002	0.000031	0.000022	0.059	<0.000010	<0.000010	<0.000010	0.000023	0.000078	0.000078
<i>Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00001	0.000018	0.000019	0.000009	0.000018	0.000443	0.000004	0.000005	0.000006	0.000017	0.000029	0.000028
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	14.3	14.7	7.69	14.9	335	3.13	3.31	4.25	13.5	23	22.5
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	0.00012	0.00012	0.00015	<0.00010	<0.0010	<0.00010	0.00067	0.00025	0.00016	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00018	<0.00010	<0.00010	0.00043	0.0578	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)-Dissolved (Lab Result)	mg/L	-	0.2	0.0005	0.00143	0.00128	0.00235	0.00116	0.0267	0.00053	0.00057	0.00063	0.00166	0.00202	0.00233
<i>Copper (Cu)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.00128	0.00135	0.00068	0.00132	0.03111	0.00032	0.00034	0.00041	0.00121	0.00205	0.00199
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.106	0.166	0.061	0.141	4.05	0.15	0.149	0.076	0.109	0.085	0.109
Lead (Pb)-Dissolved (Lab Result)	mg/L	-	0.2	0.00005	0.000451	<0.000050	0.000454	0.000621	0.00116	0.00007	0.000062	0.000163	0.000245	0.000098	0.000132
<i>Lead (Pb)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.00005	0.001273	0.001381	0.000495	0.001340	0.147844	0.000165	0.000176	0.000235	0.001171	0.002579	0.002467
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00118	0.00059	0.00075	0.00101	0.0285	<0.00050	<0.00050	<0.00050	0.00071	0.00128	0.00124
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	3.16	3.69	0.975	3.25	291	0.475	0.492	0.566	2.85	6.65	6.25
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0728	0.0292	0.000857	0.3	6.94	0.0108	0.00862	0.00147	0.0225	0.0126	0.0126
Molybdenum (Mo)-Dissolved	mg/L	0.073	0.5	0.00005	0.000354	0.000575	0.000169	0.000225	<0.00050	0.000115	0.000113	<0.000050	0.000443	0.000847	0.00088
Nickel (Ni)-Dissolved (Lab Result)	mg/L	-	0.5	0.0005	0.00112	0.00081	0.00072	0.00111	0.189	<0.00050	<0.00050	<0.00050	0.00118	0.00378	0.00355
<i>Nickel (Ni)-Diss. (Hardness Adjusted Guideline)</i>	mg/L	-	-	0.0005	0.05532	0.05806	0.03149	0.05704	0.94552	0.01631	0.01699	0.02016	0.05262	0.08432	0.08212
Phosphorus (P)-Dissolved	mg/L	-	-	0.3	<0.30	<0.30	<0.30	<0.30	<3.0	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved	mg/L	-	-	0.05	0.927	0.971	0.584	0.889	6.32	0.718	0.731	0.716	1.01	0.771	0.9
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	0.00033	0.0003	<0.00010	0.00013	0.0021	<0.00010	<0.00010	<0.00010	0.00025	0.00071	0.00069
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.47	2.44	4.3	2.35	4.91	1.94	2	1.41	2.45	2.18	2.13
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	0.000015	<0.000010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.09	0.707	1.07	1.02	19.2	0.675	0.697	0.519	0.86	0.865	0.843
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0536	0.0434	0.0265	0.0581	1.88	0.0212	0.0219	0.0257	0.047	0.0967	0.0912
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.00042	<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	<0.0010	<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	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.000436	0.000487	0.000173	0.000489	0.0037	0.000392	0.000429	0.000489	0.000474	0.000622	0.000557
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.5	0.003	0.0049	<0.0010	0.0045	0.0065	76.1	0.0021	0.0071	0.0037	0.0047	0.006	0.0053
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0008	<0.00080	<0.00080	<0.00080	<0.00080	<0.0080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines - CCME - I
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; June 4-6, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	DUPLICATE 1 - K8	DUPLICATE 2 - V17A	TRAVEL BLANK	FIELD BLANK
				Date Sampled Time	04-JUN-13 17:20	05-JUN-13 12:48	-	05-JUN-13 13:32
				Detection Limit				
Temperature (in-situ)	°C	-	-	-	-	-	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	-	-	-
pH (in-situ)	-	6.5 - 9.0	6.5	-	-	-	-	-
Hardness (as CaCO3)	mg/L	-	-	0.5	13.2	40	<0.50	<0.50
pH (lab)	pH	6.5 - 9.0	6.5	0.1	7.53	7.69	6.03	6.11
Total Suspended Solids	mg/L	-	15	1.0	8.1	8.7	<1.0	<1.0
Total Dissolved Solids	mg/L	-	-	3.0	29.6	71	<3.0	<3.0
Alkalinity Total	mg/L	-	-	2.0	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	2.0	11.3	22.1	<2.0	<2.0
Ammonia, Total (as N)	mg/L	-	1.3	0.005	0.008	0.0095	0.0098	<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	0.041	0.078	<0.020	<0.020
Nitrate (as N)	mg/L	3.0	-	0.005	0.0061	0.0675	<0.0050	<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	0.0139	0.0159	<0.0020	<0.0020
Sulfate (SO4)	mg/L	-	-	0.5	2.3	20.4	<0.50	<0.50
Dissolved Organic Carbon	mg/L	-	-	0.5	4.9	7.72	-	<0.50
Total Organic Carbon	mg/L	-	-	0.5	4.15	7.06	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.17	0.277	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.1	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.05	0.0001	0.00025	0.00162	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0126	0.0196	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total (Lab Result)	mg/L	-	0.02	0.00001	0.000017	0.000045	<0.000010	<0.000010
<i>Cadmium (Cd)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.00001</i>	<i>0.000006</i>	<i>0.000015</i>	<i>-</i>	<i>-</i>
Calcium (Ca)-Total	mg/L	-	-	0.02	4.43	11.6	<0.020	<0.020
Chromium (Cr)-Total	mg/L	0.001	-	0.0001	0.00029	0.0004	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	0.00023	<0.00010	<0.00010
Copper (Cu)-Total (Lab Result)	mg/L	-	0.2	0.0005	0.00083	0.0016	<0.00050	<0.00050
<i>Copper (Cu)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.0005</i>	<i>0.00042</i>	<i>0.00108</i>	<i>-</i>	<i>-</i>
Iron (Fe)-Total	mg/L	0.3	-	0.01	0.242	0.386	<0.010	<0.010
Lead (Pb)-Total (Lab Result)	mg/L	-	0.2	0.00005	0.000558	0.00248	<0.000050	<0.000050
<i>Lead (Pb)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.00005</i>	<i>0.000242</i>	<i>0.000991</i>	<i>-</i>	<i>-</i>
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00064	0.00055	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.005	0.614	3.3	<0.0050	<0.0050
Manganese (Mn)-Total	mg/L	-	-	0.00005	0.00578	0.0271	<0.000050	<0.000050
Molybdenum (Mo)-Total	mg/L	0.073	0.5	0.00005	0.000052	0.000085	<0.000050	<0.000050
Nickel (Ni)-Total (Lab Result)	mg/L	-	0.5	0.0005	<0.00050	0.00109	<0.00050	<0.00050
<i>Nickel (Ni)-Total (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	<i>-</i>	<i>-</i>	<i>0.0005</i>	<i>0.02051</i>	<i>0.04763</i>	<i>-</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	0.749	0.482	<0.050	<0.050
Selenium (Se)-Total	mg/L	0.001	0.05	0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	1.66	3.67	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	0.000018	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	0.533	1.04	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.027	0.0493	<0.00020	<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	-	-	0.00001	0.000554	0.00106	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.5	0.003	0.0032	0.0705	<0.0030	<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	0.0457	0.0895	-	<0.0010



Table C-1. Water Quality Parameter Guideline Exceedances; June 4-6, 2013.

Analyte	Units	CCME-WATER-FAL	Faro Effluent Quality Standards	Station ID	DUPLICATE 1 - K8	DUPLICATE 2 - V17A	TRAVEL BLANK	FIELD BLANK
				Date Sampled Time	04-JUN-13 17:20	05-JUN-13 12:48	-	05-JUN-13 13:32
				Detection Limit				
Antimony (Sb)-Dissolved	mg/L	-	0.1	0.0001	<0.00010	<0.00010	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.05	0.0001	0.00015	0.00101	-	<0.00010
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0105	0.0152	-	<0.000050
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved (Lab Result)	mg/L	-	0.02	0.00001	<0.000010	0.000023	-	<0.000010
<i>Cadmium (Cd)-Diss. (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	-	-	<i>0.00001</i>	<i>0.000006</i>	<i>0.000015</i>	-	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.02	4.36	10.9	-	<0.020
Chromium (Cr)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00013	-	<0.00010
Copper (Cu)-Dissolved (Lab Result)	mg/L	-	0.2	0.0005	0.00059	0.00108	-	<0.00020
<i>Copper (Cu)-Diss. (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	-	-	<i>0.0005</i>	<i>0.00042</i>	<i>0.00108</i>	-	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.071	0.134	-	<0.010
Lead (Pb)-Dissolved (Lab Result)	mg/L	-	0.2	0.00005	0.000155	0.000338	-	<0.000050
<i>Lead (Pb)-Diss. (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	-	-	<i>0.00005</i>	<i>0.000242</i>	<i>0.000991</i>	-	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.005	0.568	3.08	-	<0.0050
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.00141	0.0219	-	<0.000050
Molybdenum (Mo)-Dissolved	mg/L	0.073	0.5	0.00005	<0.000050	0.000071	-	<0.000050
Nickel (Ni)-Dissolved (Lab Result)	mg/L	-	0.5	0.0005	<0.00050	0.00081	-	<0.00050
<i>Nickel (Ni)-Diss. (Hardness Adjusted Guideline)</i>	<i>mg/L</i>	-	-	<i>0.0005</i>	<i>0.02051</i>	<i>0.04763</i>	-	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.3	<0.30	<0.30	-	<0.30
Potassium (K)-Dissolved	mg/L	-	-	0.05	0.725	0.445	-	<0.050
Selenium (Se)-Dissolved	mg/L	0.001	0.05	0.0001	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	1.49	3.36	-	<0.050
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.519	0.98	-	0.167
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0258	0.0461	-	<0.00020
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	mg/L	-	-	0.00001	0.000469	0.000887	-	<0.000010
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.5	0.003	0.0014	0.0623	-	<0.0010
Zirconium (Zr)-Dissolved	mg/L	-	-	0.0008	<0.00080	<0.00080	-	<0.00080

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines - CCME - I
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,
JUNE 4-6, 2013**

Page is intentionally blank.



	V17A	DUPLICATE 2 - V17A	Detection Limit	QA/QC Category	Relative Percent Difference % RPD	K8	DUPLICATE 1 - K8	Detection Limit	QA/QC Category	Relative Percent Difference % RPD	FIELD BLANK	TRAVEL BLANK
Date Sampled	05-JUN-13	05-JUN-13	DL			04-JUN-13	04-JUN-13	DL			05-JUN-13	
Time Sampled	12:48	12:48				17:11	17:20				13:32	
Physical Tests												
Hardness (as CaCO3)	40.7	40.0	0.50	RPD	1.7	12.9	13.2	0.50	RPD	-2.3	<0.50	<0.50
pH	7.68	7.69	0.10	RPD	-0.1	7.46	7.53	0.10	RPD	-0.9	6.11	6.03
Total Suspended Solids	6.5	8.7	1.0	RPD	-28.9	4.3	8.1	1.0	RPD	-61.3	<1.0	<1.0
Total Dissolved Solids	75.7	71.0	3.0	RPD	6.4	28.3	29.6	3.0	RPD	-4.5	<3.0	<3.0
Anions and Nutrients												
Alkalinity, Total	-	-	-			-	-	-			-	-
Alkalinity, Total (as CaCO3)	22.4	22.1	2.0	RPD	1.3	11.5	11.3	2.0	RPD	1.8	<2.0	<2.0
Ammonia, Total (as N)	0.0067	0.0095	0.0050	<2XDL	<2XDL	<0.0050	0.0080	0.0050	<DL	<DL	<0.0050	0.0098
Chloride (Cl)	<0.50	<0.50	0.50	<DL	<DL	<0.50	<0.50	0.50	<DL	<DL	<0.50	<0.50
Fluoride (F)	0.079	0.078	0.020	<2XDL	<2XDL	0.044	0.041	0.020	<2XDL	<2XDL	<0.020	<0.020
Nitrate (as N)	0.0702	0.0675	0.0050	RPD	3.9	0.0070	0.0061	0.0050	<2XDL	<2XDL	<0.0050	<0.0050
Nitrite (as N)	<0.0010	<0.0010	0.0010	<DL	<DL	<0.0010	<0.0010	0.0010	<DL	<DL	<0.0010	<0.0010
Phosphorus (P)-Total	0.0215	0.0159	0.0020	RPD	29.9	0.0140	0.0139	0.0020	RPD	0.7	<0.0020	<0.0020
Sulfate (SO4)	20.2	20.4	0.50	RPD	-1.0	2.29	2.30	0.50	<2XDL	<2XDL	<0.50	<0.50
Organic / Inorganic Carbon												
Dissolved Organic Carbon	8.62	7.72	0.50	RPD	11.0	5.48	4.90	0.50	RPD	11.2	<0.50	-
Total Organic Carbon	8.53	7.06	0.50	RPD	18.9	4.56	4.15	0.50	RPD	9.4	<0.50	<0.50
Total Metals												
Aluminum (Al)-Total	0.232	0.277	0.0030	RPD	-17.7	0.161	0.170	0.0030	RPD	-5.4	<0.0030	<0.0030
Antimony (Sb)-Total	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010
Arsenic (As)-Total	0.00135	0.00162	0.00010	RPD	-18.2	0.00024	0.00025	0.00010	<2XDL	<2XDL	<0.00010	<0.00010
Barium (Ba)-Total	0.0170	0.0196	0.000050	RPD	-14.2	0.0124	0.0126	0.000050	RPD	-1.6	<0.000050	<0.000050
Beryllium (Be)-Total	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010
Bismuth (Bi)-Total	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	<0.00050
Boron (B)-Total	<0.010	<0.010	0.010	<DL	<DL	<0.010	<0.010	0.010	<DL	<DL	<0.010	<0.010
Cadmium (Cd)-Total	0.000041	0.000045	0.000010	<2XDL	<2XDL	0.000015	0.000017	0.000010	<2XDL	<2XDL	<0.000010	<0.000010
Calcium (Ca)-Total	11.0	11.6	0.020	RPD	-5.3	4.26	4.43	0.020	RPD	-3.9	<0.020	<0.020
Chromium (Cr)-Total	0.00036	0.00040	0.00010	<2XDL	<2XDL	0.00030	0.00029	0.00010	<2XDL	<2XDL	<0.00010	<0.00010
Cobalt (Co)-Total	0.00021	0.00023	0.00010	<2XDL	<2XDL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010
Copper (Cu)-Total	0.00132	0.00160	0.00050	<2XDL	<2XDL	0.00089	0.00083	0.00050	<2XDL	<2XDL	<0.00050	<0.00050
Iron (Fe)-Total	0.329	0.386	0.010	RPD	-15.9	0.239	0.242	0.010	RPD	-1.2	<0.010	<0.010
Lead (Pb)-Total	0.00231	0.00248	0.000050	RPD	-7.1	0.000572	0.000558	0.000050	RPD	2.5	<0.000050	<0.000050
Lithium (Li)-Total	0.00067	0.00055	0.00050	<2XDL	<2XDL	<0.00050	0.00064	0.00050	<DL	<DL	<0.00050	<0.00050
Magnesium (Mg)-Total	2.84	3.30	0.0050	RPD	-15.0	0.594	0.614	0.0050	RPD	-3.3	<0.0050	<0.0050
Manganese (Mn)-Total	0.0230	0.0271	0.000050	RPD	-16.4	0.00624	0.00578	0.000050	RPD	7.7	<0.000050	<0.000050
Molybdenum (Mo)-Total	0.000090	0.000085	0.000050	<2XDL	<2XDL	0.000051	0.000052	0.000050	<2XDL	<2XDL	<0.000050	<0.000050
Nickel (Ni)-Total	0.00099	0.00109	0.00050	<2XDL	<2XDL	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	<0.00050
Phosphorus (P)-Total	<0.30	<0.30	0.30	<DL	<DL	<0.30	<0.30	0.30	<DL	<DL	<0.30	<0.30
Potassium (K)-Total	0.410	0.482	0.050	RPD	-16.1	0.748	0.749	0.050	RPD	-0.1	<0.050	<0.050
Selenium (Se)-Total	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010
Silicon (Si)-Total	3.49	3.67	0.050	RPD	-5.0	1.62	1.66	0.050	RPD	-2.4	<0.050	<0.050
Silver (Ag)-Total	0.000022	0.000018	0.000010	<2XDL	<2XDL	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	<0.000010
Sodium (Na)-Total	0.880	1.04	0.050	RPD	-16.7	0.539	0.533	0.050	RPD	1.1	<0.050	<0.050



Strontium (Sr)-Total	0.0473	0.0493	0.00020	RPD	-4.1	0.0271	0.0270	0.00020	RPD	0.4	<0.00020	<0.00020
Thallium (Tl)-Total	0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	<0.000010
Tin (Sn)-Total	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010
Titanium (Ti)-Total	<0.010	<0.010	0.010	<DL	<DL	<0.010	<0.010	0.010	<DL	<DL	<0.010	<0.010
Uranium (U)-Total	0.00104	0.00106	0.000010	RPD	-1.9	0.000555	0.000554	0.000010	RPD	0.2	<0.000010	<0.000010
Vanadium (V)-Total	<0.0010	<0.0010	0.0010	RPD	<DL	<0.0010	<0.0010	0.0010	<DL	<DL	<0.0010	<0.0010
Zinc (Zn)-Total	0.0592	0.0705	0.0030	RPD	-17.4	0.0040	0.0032	0.0030	<2XDL	<2XDL	<0.0030	<0.0030
Zirconium (Zr)-Total	<0.00080	<0.00080	0.00080	<DL	<DL	<0.00080	<0.00080	0.00080	<DL	<DL	<0.00080	<0.00080
Dissolved Metals												
Dissolved Metals Filtration												
Location	FIELD	FIELD	-			FIELD	FIELD	-			FIELD	-
Aluminum (Al)-Dissolved	0.0896	0.0895	0.0010	RPD	0.1	0.0484	0.0457	0.0010	RPD	5.7	<0.0010	-
Antimony (Sb)-Dissolved	<0.00010	<0.00010	0.00010	RPD	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	-
Arsenic (As)-Dissolved	0.00098	0.00101	0.00010	RPD	-3.0	0.00016	0.00015	0.00010	<2XDL	<2XDL	<0.00010	-
Barium (Ba)-Dissolved	0.0155	0.0152	0.000050	RPD	2.0	0.0107	0.0105	0.000050	RPD	1.9	<0.000050	-
Beryllium (Be)-Dissolved	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	-
Bismuth (Bi)-Dissolved	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	-
Boron (B)-Dissolved	<0.010	<0.010	0.010	<DL	<DL	<0.010	<0.010	0.010	<DL	<DL	<0.010	-
Cadmium (Cd)-Dissolved	0.000024	0.000023	0.000010	<2XDL	<2XDL	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	-
Calcium (Ca)-Dissolved	11.0	10.9	0.020	RPD	0.9	4.25	4.36	0.020	RPD	-2.6	<0.020	-
Chromium (Cr)-Dissolved	0.00021	<0.00010	0.00010	<DL	<DL	0.00025	<0.00010	0.00010	<DL	<DL	<0.00010	-
Cobalt (Co)-Dissolved	0.00014	0.00013	0.00010	<2XDL	<2XDL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	-
Copper (Cu)-Dissolved	0.00126	0.00108	0.00020	RPD	15.4	0.00063	0.00059	0.00020	<2XDL	<2XDL	<0.00020	-
Iron (Fe)-Dissolved	0.178	0.134	0.010	RPD	28.2	0.076	0.071	0.010	RPD	6.8	<0.010	-
Lead (Pb)-Dissolved	0.000315	0.000338	0.000050	RPD	-7.0	0.000163	0.000155	0.000050	<2XDL	<2XDL	<0.000050	-
Lithium (Li)-Dissolved	0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	-
Magnesium (Mg)-Dissolved	3.18	3.08	0.0050	RPD	3.2	0.566	0.568	0.0050	RPD	-0.4	<0.0050	-
Manganese (Mn)-Dissolved	0.0225	0.0219	0.000050	RPD	2.7	0.00147	0.00141	0.000050	RPD	4.2	<0.000050	-
Molybdenum (Mo)-Dissolved	0.000091	0.000071	0.000050	<2XDL	<2XDL	<0.000050	<0.000050	0.000050	<DL	<DL	<0.000050	-
Nickel (Ni)-Dissolved	0.00085	0.00081	0.00050	<2XDL	<2XDL	<0.00050	<0.00050	0.00050	<DL	<DL	<0.00050	-
Phosphorus (P)-Dissolved	<0.30	<0.30	0.30	<DL	<DL	<0.30	<0.30	0.30	<DL	<DL	<0.30	-
Potassium (K)-Dissolved	0.447	0.445	0.050	RPD	0.4	0.716	0.725	0.050	RPD	-1.2	<0.050	-
Selenium (Se)-Dissolved	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	-
Silicon (Si)-Dissolved	3.33	3.36	0.050	RPD	-0.9	1.41	1.49	0.050	RPD	-5.5	<0.050	-
Silver (Ag)-Dissolved	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	-
Sodium (Na)-Dissolved	0.986	0.980	0.050	RPD	0.6	0.519	0.519	0.050	RPD	0.0	0.167	-
Strontium (Sr)-Dissolved	0.0468	0.0461	0.00020	RPD	1.5	0.0257	0.0258	0.00020	RPD	-0.4	<0.00020	-
Thallium (Tl)-Dissolved	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	<0.000010	0.000010	<DL	<DL	<0.000010	-
Tin (Sn)-Dissolved	<0.00010	<0.00010	0.00010	RPD	<DL	<0.00010	<0.00010	0.00010	<DL	<DL	<0.00010	-
Titanium (Ti)-Dissolved	<0.010	<0.010	0.010	RPD	<DL	<0.010	<0.010	0.010	<DL	<DL	<0.010	-
Uranium (U)-Dissolved	0.000896	0.000887	0.000010	RPD	1.0	0.000489	0.000469	0.000010	RPD	4.2	<0.000010	-
Vanadium (V)-Dissolved	<0.0010	<0.0010	0.0010	<DL	<DL	<0.0010	<0.0010	0.0010	<DL	<DL	<0.0010	-
Zinc (Zn)-Dissolved	0.0627	0.0623	0.0010	RPD	0.6	0.0037	0.0014	0.0010	RPD	90.2	<0.0010	-
Zirconium (Zr)-Dissolved	<0.00080	<0.00080	0.00080	<DL	<DL	<0.00080	<0.00080	0.00080	<DL	<DL	<0.00080	-



**APPENDIX E ALS CERTIFICATE OF ANALYSIS,
JUNE 4-6, 2013**

This page is intentionally blank.



ENVIRONMENTAL DYNAMICS INC.
ATTN: Meghan Marjanovic
2195 2nd Avenue
Whitehorse YT Y1A 3T8

Date Received: 06-JUN-13
Report Date: 24-JUN-13 15:08 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1312901
Project P.O. #: NOT SUBMITTED
Job Reference: FARO SURFACE WQ 13-Y-0199
C of C Numbers: 1, 2, 3, 4, 5
Legal Site Desc:

Comments: Please note we received three quarter filled raw bottle for ALS identified sample L1312901-4. We performed TSS, TDS and Total Phosphorus from this possible contaminated bottle since these tests cannot be performed at Whitehorse lab. Other tests which require raw sample were performed on another raw cut of the sample in Whitehorse lab.

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	L1312901-1 Water 05-JUN-13 16:00 V8	L1312901-2 Water 05-JUN-13 12:48 V17A	L1312901-3 Water 04-JUN-13 12:27 V20A	L1312901-4 Water 05-JUN-13 13:14 VR	L1312901-5 Water 06-JUN-13 09:14 VGMMAIN
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	114	40.7	143	12.9	110
	pH (pH)	8.17	7.68	8.20	7.06	8.14
	Total Suspended Solids (mg/L)	110	6.5	<1.0	1.7	6.2
	Total Dissolved Solids (mg/L)	149	75.7	160	38.8	145
Anions and Nutrients	Alkalinity, Total (mg/L)				10.0	
	Alkalinity, Total (as CaCO3) (mg/L)	84.1	22.4	151		76.8
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0067	<0.0050	0.0068	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.091	0.079	0.107	0.066	0.076
	Nitrate (as N) (mg/L)	0.0823	0.0702	<0.0050	<0.0050	0.0913
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.120	0.0215	0.0102	0.0087	0.0119
	Sulfate (SO4) (mg/L)	41.5	20.2	6.81	2.34	46.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	6.42	8.62	7.42	8.18	6.76
	Total Organic Carbon (mg/L)	6.35	8.53	7.48	8.50	6.19
Total Metals	Aluminum (Al)-Total (mg/L)	2.64	0.232	0.0054	0.103	0.198
	Antimony (Sb)-Total (mg/L)	0.00031	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00334	0.00135	0.00050	0.00034	0.00070
	Barium (Ba)-Total (mg/L)	0.0957	0.0170	0.0914	0.0148	0.0336
	Beryllium (Be)-Total (mg/L)	0.00011	<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)	0.000150	0.000041	<0.000010	0.000020	0.000049
	Calcium (Ca)-Total (mg/L)	29.3	11.0	38.3	4.15	27.6
	Chromium (Cr)-Total (mg/L)	0.00837	0.00036	0.00012	0.00021	0.00063
	Cobalt (Co)-Total (mg/L)	0.00226	0.00021	<0.00010	<0.00010	0.00021
	Copper (Cu)-Total (mg/L)	0.00727	0.00132	<0.00050	0.00130	0.00232
	Iron (Fe)-Total (mg/L)	4.16	0.329	0.032	0.075	0.373
	Lead (Pb)-Total (mg/L)	0.00764	0.00231	<0.000050	0.000213	0.00153
	Lithium (Li)-Total (mg/L)	0.00458	0.00067	0.00195	<0.00050	0.00161
	Magnesium (Mg)-Total (mg/L)	12.3	2.84	11.9	0.783	10.5
	Manganese (Mn)-Total (mg/L)	0.0996	0.0230	0.0104	0.00195	0.0166
	Molybdenum (Mo)-Total (mg/L)	0.000763	0.000090	0.000285	0.000096	0.000416
	Nickel (Ni)-Total (mg/L)	0.0109	0.00099	<0.00050	0.00059	0.00140
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	1.25	0.410	0.792	0.444	0.843

* 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	L1312901-6 Water 05-JUN-13 15:21 VW1	L1312901-7 Water 05-JUN-13 15:35 VW2	L1312901-8 Water 05-JUN-13 08:34 VW3	L1312901-9 Water 04-JUN-13 11:58 FC	L1312901-10 Water 04-JUN-13 16:41 R1
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	94.5	253	39.9	4.89	34.5
	pH (pH)	8.18	8.49	7.94	7.11	7.87
	Total Suspended Solids (mg/L)	133	1.4	9.5	12.0	62.3
	Total Dissolved Solids (mg/L)	128	327	72.7	27.0	56.1
Anions and Nutrients	Alkalinity, Total (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	80.1	217	28.4	4.4	32.2
	Ammonia, Total (as N) (mg/L)	0.0067	<0.0050	<0.0050	0.0129	0.0070
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.115	0.147	0.072	0.040	0.059
	Nitrate (as N) (mg/L)	0.0621	0.319	0.0518	<0.0050	0.0193
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.198	0.0155	0.0174	0.0283	0.515
	Sulfate (SO4) (mg/L)	22.9	74.4	15.6	<0.50	6.25
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	7.99	5.59	8.29	9.02	6.52
	Total Organic Carbon (mg/L)	9.4	5.43	10.3	9.53	8.50
Total Metals	Aluminum (Al)-Total (mg/L)	2.33	0.0395	0.305	0.421	1.87
	Antimony (Sb)-Total (mg/L)	0.00032	0.00022	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00333	0.00062	0.00121	0.00033	0.00167
	Barium (Ba)-Total (mg/L)	0.0722	0.0909	0.0221	0.0142	0.0488
	Beryllium (Be)-Total (mg/L)	0.00015	<0.00010	<0.00010	<0.00010	0.00017
	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)	0.000099	0.000077	0.000060	0.000031	0.000078
	Calcium (Ca)-Total (mg/L)	26.8	70.2	12.2	1.53	11.5
	Chromium (Cr)-Total (mg/L)	0.00598	0.00029	0.00055	0.00069	0.00341
	Cobalt (Co)-Total (mg/L)	0.00201	<0.00010	0.00021	0.00020	0.00176
	Copper (Cu)-Total (mg/L)	0.00621	0.00108	0.00156	0.00153	0.00487
	Iron (Fe)-Total (mg/L)	3.79	0.056	0.387	0.414	3.60
	Lead (Pb)-Total (mg/L)	0.0132	0.000117	0.00146	0.00362	0.00414
	Lithium (Li)-Total (mg/L)	0.00604	0.00271	0.00066	0.00083	0.00393
	Magnesium (Mg)-Total (mg/L)	7.10	28.7	3.12	0.392	2.78
	Manganese (Mn)-Total (mg/L)	0.0917	0.00110	0.0167	0.0108	0.103
	Molybdenum (Mo)-Total (mg/L)	0.000717	0.00193	0.000100	0.000050	0.000213
	Nickel (Ni)-Total (mg/L)	0.00702	0.00115	0.00102	0.00090	0.00424
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.835	1.02	0.497	0.778	1.06

* 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	L1312901-11 Water 04-JUN-13 10:50 R4	L1312901-12 Water 04-JUN-13 11:19 R5	L1312901-13 Water 04-JUN-13 10:15 R6	L1312901-14 Water 04-JUN-13 14:53 W10	L1312901-15 Water 04-JUN-13 14:21 X14
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	46.0	48.7	51.9	23.2	50.7
	pH (pH)	7.90	7.94	8.03	7.73	7.90
	Total Suspended Solids (mg/L)	19.0	42.7	240	3.9	28.0
	Total Dissolved Solids (mg/L)	72.2	70.5	71.9	51.9	74.5
Anions and Nutrients	Alkalinity, Total (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	35.9	38.8	48.6	21.8	36.3
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0057	0.0091	<0.0050	0.0087
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.060	0.059	0.048	0.080	0.062
	Nitrate (as N) (mg/L)	0.0285	0.0302	0.0410	<0.0050	0.0185
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0343	0.0567	0.193	0.0179	0.0367
	Sulfate (SO4) (mg/L)	14.3	13.1	7.31	2.18	17.6
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	6.68	7.13	6.94	9.18	6.41
	Total Organic Carbon (mg/L)	6.78	7.08	9.18	8.19	7.01
Total Metals	Aluminum (Al)-Total (mg/L)	0.599	0.953	2.34	0.171	0.575
	Antimony (Sb)-Total (mg/L)	0.00015	0.00034	0.00029	<0.00010	0.00011
	Arsenic (As)-Total (mg/L)	0.00098	0.00142	0.00234	0.00036	0.00091
	Barium (Ba)-Total (mg/L)	0.0495	0.0555	0.0721	0.0102	0.0343
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	0.00016	<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)	0.000068	0.000117	0.000157	0.000036	0.000050
	Calcium (Ca)-Total (mg/L)	13.4	13.8	16.2	7.76	15.3
	Chromium (Cr)-Total (mg/L)	0.00156	0.00225	0.00504	0.00040	0.00150
	Cobalt (Co)-Total (mg/L)	0.00086	0.00116	0.00204	<0.00010	0.00090
	Copper (Cu)-Total (mg/L)	0.00309	0.00396	0.00686	0.00270	0.00250
	Iron (Fe)-Total (mg/L)	1.08	1.62	3.65	0.184	1.07
	Lead (Pb)-Total (mg/L)	0.00624	0.00599	0.00323	0.000899	0.00602
	Lithium (Li)-Total (mg/L)	0.00170	0.00222	0.00459	0.00086	0.00177
	Magnesium (Mg)-Total (mg/L)	3.00	3.28	3.87	1.01	3.54
	Manganese (Mn)-Total (mg/L)	0.294	0.311	0.117	0.00329	0.360
	Molybdenum (Mo)-Total (mg/L)	0.000332	0.00108	0.000767	0.000203	0.000280
	Nickel (Ni)-Total (mg/L)	0.00290	0.00365	0.00614	0.00092	0.00258
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	0.963	1.02	1.02	0.596	0.984

* 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	L1312901-16 Water 04-JUN-13 14:53 NWID	L1312901-17 Water 05-JUN-13 13:46 USFR	L1312901-18 Water 05-JUN-13 14:46 GCULV	L1312901-19 Water 04-JUN-13 17:11 K8	L1312901-20 Water 04-JUN-13 09:19 A1
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	2040	9.76	10.3	12.9	45.6
	pH (pH)	7.56	7.46	7.42	7.46	7.91
	Total Suspended Solids (mg/L)	61.5	13.7	38.0	4.3	119
	Total Dissolved Solids (mg/L)	3270	72.7	29.3	28.3	73.7
Anions and Nutrients	Alkalinity, Total (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	144	9.2	10.1	11.5	38.8
	Ammonia, Total (as N) (mg/L)	0.0195	<0.0050	<0.0050	<0.0050	0.0082
	Chloride (Cl) (mg/L)	<10 ^{DLA}	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.40 ^{DLA}	0.047	0.047	0.044	0.061
	Nitrate (as N) (mg/L)	1.18	<0.0050	0.0067	0.0070	0.0327
	Nitrite (as N) (mg/L)	<0.020 ^{DLA}	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0145	0.0229	0.0361	0.0140	0.166
	Sulfate (SO4) (mg/L)	2220	2.17	2.31	2.29	10.2
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	4.29	4.84	4.97	5.48	7.38
	Total Organic Carbon (mg/L)	5.10	4.80	7.48	4.56	7.61
Total Metals	Aluminum (Al)-Total (mg/L)	1.89	0.304	1.06	0.161	2.19
	Antimony (Sb)-Total (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	0.00028
	Arsenic (As)-Total (mg/L)	0.0036	0.00039	0.00107	0.00024	0.00275
	Barium (Ba)-Total (mg/L)	0.0899	0.0170	0.0309	0.0124	0.102
	Beryllium (Be)-Total (mg/L)	<0.0010 ^{DLA}	<0.00010	0.00010	<0.00010	0.00012
	Bismuth (Bi)-Total (mg/L)	<0.0050 ^{DLA}	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.10 ^{DLA}	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0628	0.000018	0.000050	0.000015	0.000172
	Calcium (Ca)-Total (mg/L)	337	3.25	3.73	4.26	14.9
	Chromium (Cr)-Total (mg/L)	0.0017	0.00049	0.00164	0.00030	0.00531
	Cobalt (Co)-Total (mg/L)	0.0608	0.00019	0.00065	<0.00010	0.00186
	Copper (Cu)-Total (mg/L)	0.118	0.00108	0.00204	0.00089	0.00679
	Iron (Fe)-Total (mg/L)	9.47	0.515	1.60	0.239	3.42
	Lead (Pb)-Total (mg/L)	0.172	0.000446	0.00195	0.000572	0.00585
	Lithium (Li)-Total (mg/L)	0.0282	<0.00050	0.00190	<0.00050	0.00341
	Magnesium (Mg)-Total (mg/L)	301	0.570	0.793	0.594	3.89
	Manganese (Mn)-Total (mg/L)	7.49	0.0250	0.0717	0.00624	0.237
	Molybdenum (Mo)-Total (mg/L)	<0.00050 ^{DLA}	0.000151	0.000230	0.000051	0.000672
	Nickel (Ni)-Total (mg/L)	0.201	0.00063	0.00154	<0.00050	0.00738
	Phosphorus (P)-Total (mg/L)	<3.0 ^{DLA}	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	6.66	0.766	0.893	0.748	1.48

* 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	L1312901-21 Water 06-JUN-13 09:49 P1	L1312901-22 Water 04-JUN-13 09:37 P4	L1312901-23 Water 04-JUN-13 17:20 DUPLICATE 1	L1312901-24 Water 05-JUN-13 12:48 DUPLICATE 2	L1312901-25 Water 05-JUN-13 13:32 FIELD BLANK
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	84.8	81.9	13.2	40.0	<0.50
	pH (pH)	8.10	8.12	7.53	7.69	6.11
	Total Suspended Solids (mg/L)	130	164	8.1	8.7	<1.0
	Total Dissolved Solids (mg/L)	121	123	29.6	71.0	<3.0
Anions and Nutrients	Alkalinity, Total (mg/L)					
	Alkalinity, Total (as CaCO3) (mg/L)	68.7	65.3	11.3	22.1	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050	0.0055	0.0080	0.0095	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.094	0.089	0.041	0.078	<0.020
	Nitrate (as N) (mg/L)	0.0106	<0.0050	0.0061	0.0675	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.187	0.269	0.0139	0.0159	<0.0020
	Sulfate (SO4) (mg/L)	28.5	25.1	2.30	20.4	<0.50
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	7.49	8.23	4.90	7.72	<0.50
	Total Organic Carbon (mg/L)	7.83	9.43	4.15	7.06	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	2.10	2.75	0.170	0.277	<0.0030
	Antimony (Sb)-Total (mg/L)	0.00062	0.00073	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00339	0.00450	0.00025	0.00162	<0.00010
	Barium (Ba)-Total (mg/L)	0.178	0.221	0.0126	0.0196	<0.000050
	Beryllium (Be)-Total (mg/L)	0.00013	0.00016	<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)	0.000451	0.000515	0.000017	0.000045	<0.000010
	Calcium (Ca)-Total (mg/L)	24.1	24.3	4.43	11.6	<0.020
	Chromium (Cr)-Total (mg/L)	0.00426	0.00566	0.00029	0.00040	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00171	0.00234	<0.00010	0.00023	<0.00010
	Copper (Cu)-Total (mg/L)	0.00856	0.0109	0.00083	0.00160	<0.00050
	Iron (Fe)-Total (mg/L)	3.76	5.28	0.242	0.386	<0.010
	Lead (Pb)-Total (mg/L)	0.00255	0.00363	0.000558	0.00248	<0.000050
	Lithium (Li)-Total (mg/L)	0.00339	0.00406	0.00064	0.00055	<0.00050
	Magnesium (Mg)-Total (mg/L)	7.85	7.92	0.614	3.30	<0.0050
	Manganese (Mn)-Total (mg/L)	0.125	0.164	0.00578	0.0271	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.00135	0.00148	0.000052	0.000085	<0.000050
	Nickel (Ni)-Total (mg/L)	0.0115	0.0140	<0.00050	0.00109	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	1.36	1.61	0.749	0.482	<0.050

* 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				
	L1312901-26 Water TRAVEL BLANK				
Grouping	Analyte				
WATER					
Physical Tests	Hardness (as CaCO3) (mg/L)	<0.50			
	pH (pH)	6.03			
	Total Suspended Solids (mg/L)	<1.0			
	Total Dissolved Solids (mg/L)	<3.0			
Anions and Nutrients	Alkalinity, Total (mg/L)				
	Alkalinity, Total (as CaCO3) (mg/L)	<2.0			
	Ammonia, Total (as N) (mg/L)	0.0098			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	<0.020			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Phosphorus (P)-Total (mg/L)	<0.0020			
	Sulfate (SO4) (mg/L)	<0.50			
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)				
	Total Organic Carbon (mg/L)	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.000050			
	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)	<0.000010			
	Calcium (Ca)-Total (mg/L)	<0.020			
	Chromium (Cr)-Total (mg/L)	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.00050			
	Magnesium (Mg)-Total (mg/L)	<0.0050			
	Manganese (Mn)-Total (mg/L)	<0.000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30			
	Potassium (K)-Total (mg/L)	<0.050			

* 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	L1312901-1 Water 05-JUN-13 16:00 V8	L1312901-2 Water 05-JUN-13 12:48 V17A	L1312901-3 Water 04-JUN-13 12:27 V20A	L1312901-4 Water 05-JUN-13 13:14 VR	L1312901-5 Water 06-JUN-13 09:14 VGMMAIN
Grouping	Analyte					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.00062	<0.00010	0.00035	<0.00010	0.00032
	Silicon (Si)-Total (mg/L)	8.14	3.49	4.07	3.15	3.52
	Silver (Ag)-Total (mg/L)	0.000052	0.000022	<0.000010	0.000016	0.000011
	Sodium (Na)-Total (mg/L)	1.58	0.880	1.38	1.02	1.45
	Strontium (Sr)-Total (mg/L)	0.122	0.0473	0.194	0.0222	0.112
	Thallium (Tl)-Total (mg/L)	0.000037	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)	0.071	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.00216	0.00104	0.000774	0.000699	0.00235
	Vanadium (V)-Total (mg/L)	0.0076	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0319	0.0592	<0.0030	0.0035	0.0174
	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)	0.0208	0.0896	0.0038	0.0697	0.0235
	Antimony (Sb)-Dissolved (mg/L)	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00057	0.00098	0.00052	0.00029	0.00040
	Barium (Ba)-Dissolved (mg/L)	0.0312	0.0155	0.0935	0.0142	0.0303
	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)	0.000033	0.000024	<0.000010	0.000011	0.000036
	Calcium (Ca)-Dissolved (mg/L)	27.9	11.0	38.2	3.99	27.1
	Chromium (Cr)-Dissolved (mg/L)	0.00012	0.00021	<0.00010	0.00011	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00148	0.00126	0.00038	0.00108	0.00181
	Iron (Fe)-Dissolved (mg/L)	0.049	0.178	0.025	0.042	0.057
	Lead (Pb)-Dissolved (mg/L)	0.000232	0.000315	<0.000050	0.000116	0.000194
	Lithium (Li)-Dissolved (mg/L)	0.00164	0.00050	0.00205	<0.00050	0.00136
	Magnesium (Mg)-Dissolved (mg/L)	10.7	3.18	11.6	0.722	10.3
	Manganese (Mn)-Dissolved (mg/L)	0.0108	0.0225	0.00847	0.000729	0.00488
	Molybdenum (Mo)-Dissolved (mg/L)	0.000579	0.000091	0.000272	0.000080	0.000398
	Nickel (Ni)-Dissolved (mg/L)	0.00111	0.00085	<0.00050	<0.00050	0.00095
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.830	0.447	0.792	0.424	0.815
	Selenium (Se)-Dissolved (mg/L)	0.00060	<0.00010	0.00036	<0.00010	0.00034
	Silicon (Si)-Dissolved (mg/L)	3.17	3.33	4.02	3.15	3.23
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* 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	L1312901-6 Water 05-JUN-13 15:21 VW1	L1312901-7 Water 05-JUN-13 15:35 VW2	L1312901-8 Water 05-JUN-13 08:34 VW3	L1312901-9 Water 04-JUN-13 11:58 FC	L1312901-10 Water 04-JUN-13 16:41 R1
Grouping	Analyte					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.00041	0.00215	<0.00010	<0.00010	0.00012
	Silicon (Si)-Total (mg/L)	7.77	3.91	3.62	1.96	4.54
	Silver (Ag)-Total (mg/L)	0.000059	<0.000010	0.000014	0.000017	0.000021
	Sodium (Na)-Total (mg/L)	1.32	2.06	1.03	0.573	0.886
	Strontium (Sr)-Total (mg/L)	0.137	0.284	0.0562	0.0111	0.0644
	Thallium (Tl)-Total (mg/L)	0.000076	<0.000010	<0.000010	<0.000010	0.000025
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	0.00014
	Titanium (Ti)-Total (mg/L)	0.045	<0.010	<0.010	0.011	0.063
	Uranium (U)-Total (mg/L)	0.00160	0.00476	0.00107	0.000224	0.00156
	Vanadium (V)-Total (mg/L)	0.0053	0.0012	<0.0010	<0.0010	0.0038
	Zinc (Zn)-Total (mg/L)	0.0253	0.0036	0.0513	0.0083	0.0156
	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)	0.0226	0.0036	0.0668	0.108	0.0318
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00084	0.00054	0.00066	0.00013	0.00031
	Barium (Ba)-Dissolved (mg/L)	0.0356	0.0909	0.0186	0.00928	0.0203
	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)	0.000021	0.000071	0.000031	0.000022	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	24.4	55.2	11.1	1.48	10.5
	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)	0.00124	0.00088	0.00111	0.00094	0.00071
	Iron (Fe)-Dissolved (mg/L)	0.080	<0.010	0.089	0.087	0.118
	Lead (Pb)-Dissolved (mg/L)	0.000263	<0.000050	0.000259	0.00126	0.000098
	Lithium (Li)-Dissolved (mg/L)	0.00174	0.00210	0.00056	<0.00050	0.00065
	Magnesium (Mg)-Dissolved (mg/L)	8.17	27.9	2.98	0.292	2.01
	Manganese (Mn)-Dissolved (mg/L)	0.0236	0.000188	0.00763	0.00361	0.00890
	Molybdenum (Mo)-Dissolved (mg/L)	0.000342	0.00145	0.000073	<0.000050	0.000144
	Nickel (Ni)-Dissolved (mg/L)	0.00079	0.00100	0.00065	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.719	1.01	0.454	0.725	0.851
	Selenium (Se)-Dissolved (mg/L)	0.00032	0.00248	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	3.47	3.80	3.28	2.07	2.19
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1312901-11	L1312901-12	L1312901-13	L1312901-14	L1312901-15
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUN-13	04-JUN-13	04-JUN-13	04-JUN-13	04-JUN-13
	Sampled Time	10:50	11:19	10:15	14:53	14:21
	Client ID	R4	R5	R6	W10	X14
Grouping	Analyte					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.00021	0.00043	0.00035	<0.00010	0.00015
	Silicon (Si)-Total (mg/L)	3.11	3.51	6.09	4.41	3.09
	Silver (Ag)-Total (mg/L)	0.000028	0.000046	0.000049	0.000034	0.000022
	Sodium (Na)-Total (mg/L)	0.932	0.995	0.672	1.10	1.08
	Strontium (Sr)-Total (mg/L)	0.0544	0.0538	0.0540	0.0275	0.0614
	Thallium (Tl)-Total (mg/L)	0.000025	0.000173	0.000043	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.018	0.031	0.069	<0.010	0.017
	Uranium (U)-Total (mg/L)	0.000490	0.000613	0.000964	0.000199	0.000599
	Vanadium (V)-Total (mg/L)	0.0017	0.0030	0.0084	<0.0010	0.0015
	Zinc (Zn)-Total (mg/L)	0.0185	0.0198	0.0190	0.0078	0.0171
	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)	0.0390	0.0399	0.0375	0.0575	0.0400
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00037	0.00037	0.00043	0.00028	0.00037
	Barium (Ba)-Dissolved (mg/L)	0.0279	0.0280	0.0298	0.00900	0.0224
	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)	0.000020	0.000026	0.000020	0.000031	0.000022
	Calcium (Ca)-Dissolved (mg/L)	13.7	14.3	14.7	7.69	14.9
	Chromium (Cr)-Dissolved (mg/L)	0.00012	0.00012	0.00012	0.00015	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00014	0.00018	<0.00010	<0.00010	0.00043
	Copper (Cu)-Dissolved (mg/L)	0.00147	0.00143	0.00128	0.00235	0.00116
	Iron (Fe)-Dissolved (mg/L)	0.102	0.106	0.166	0.061	0.141
	Lead (Pb)-Dissolved (mg/L)	0.000525	0.000451	<0.000050	0.000454	0.000621
	Lithium (Li)-Dissolved (mg/L)	0.00093	0.00118	0.00059	0.00075	0.00101
	Magnesium (Mg)-Dissolved (mg/L)	2.87	3.16	3.69	0.975	3.25
	Manganese (Mn)-Dissolved (mg/L)	0.0848	0.0728	0.0292	0.000857	0.300
	Molybdenum (Mo)-Dissolved (mg/L)	0.000249	0.000354	0.000575	0.000169	0.000225
	Nickel (Ni)-Dissolved (mg/L)	0.00101	0.00112	0.00081	0.00072	0.00111
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.912	0.927	0.971	0.584	0.889
	Selenium (Se)-Dissolved (mg/L)	0.00018	0.00033	0.00030	<0.00010	0.00013
	Silicon (Si)-Dissolved (mg/L)	2.40	2.47	2.44	4.30	2.35
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000015	<0.000010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1312901-16	L1312901-17	L1312901-18	L1312901-19	L1312901-20
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUN-13	05-JUN-13	05-JUN-13	04-JUN-13	04-JUN-13
	Sampled Time	14:53	13:46	14:46	17:11	09:19
	Client ID	NWID	USFR	GCULV	K8	A1
Grouping	Analyte					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.0022	<0.00010	<0.00010	<0.00010	0.00032
	Silicon (Si)-Total (mg/L)	6.00	2.26	3.31	1.62	5.88
	Silver (Ag)-Total (mg/L)	0.00017	0.000011	0.000020	<0.000010	0.000050
	Sodium (Na)-Total (mg/L)	19.8	0.699	0.772	0.539	1.01
	Strontium (Sr)-Total (mg/L)	1.89	0.0232	0.0263	0.0271	0.0566
	Thallium (Tl)-Total (mg/L)	0.00046	<0.000010	0.000024	<0.000010	0.000046
	Tin (Sn)-Total (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.10 ^{DLA}	<0.010	0.038	<0.010	0.076
	Uranium (U)-Total (mg/L)	0.00415	0.000651	0.00131	0.000555	0.000725
	Vanadium (V)-Total (mg/L)	<0.010 ^{DLA}	<0.0010	0.0019	<0.0010	0.0075
	Zinc (Zn)-Total (mg/L)	80.7	0.0035	0.0090	0.0040	0.0242
	Zirconium (Zr)-Total (mg/L)	<0.0080 ^{DLA}	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.012	0.0442	0.0427	0.0484	0.0376
	Antimony (Sb)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	<0.0010 ^{DLA}	0.00023	0.00022	0.00016	0.00058
	Barium (Ba)-Dissolved (mg/L)	0.0397	0.0122	0.0127	0.0107	0.0276
	Beryllium (Be)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0050 ^{DLA}	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.10 ^{DLA}	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0590	<0.000010	<0.000010	<0.000010	0.000023
	Calcium (Ca)-Dissolved (mg/L)	335	3.13	3.31	4.25	13.5
	Chromium (Cr)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00010	0.00067	0.00025	0.00016
	Cobalt (Co)-Dissolved (mg/L)	0.0578	<0.00010	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.0267	0.00053	0.00057	0.00063	0.00166
	Iron (Fe)-Dissolved (mg/L)	4.05	0.150	0.149	0.076	0.109
	Lead (Pb)-Dissolved (mg/L)	0.00116	0.000070	0.000062	0.000163	0.000245
	Lithium (Li)-Dissolved (mg/L)	0.0285	<0.00050	<0.00050	<0.00050	0.00071
	Magnesium (Mg)-Dissolved (mg/L)	291	0.475	0.492	0.566	2.85
	Manganese (Mn)-Dissolved (mg/L)	6.94	0.0108	0.00862	0.00147	0.0225
	Molybdenum (Mo)-Dissolved (mg/L)	<0.00050 ^{DLA}	0.000115	0.000113	<0.000050	0.000443
	Nickel (Ni)-Dissolved (mg/L)	0.189	<0.00050	<0.00050	<0.00050	0.00118
	Phosphorus (P)-Dissolved (mg/L)	<3.0 ^{DLA}	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	6.32	0.718	0.731	0.716	1.01
	Selenium (Se)-Dissolved (mg/L)	0.0021	<0.00010	<0.00010	<0.00010	0.00025
	Silicon (Si)-Dissolved (mg/L)	4.91	1.94	2.00	1.41	2.45
	Silver (Ag)-Dissolved (mg/L)	<0.00010 ^{DLA}	<0.000010	<0.000010	<0.000010	<0.000010

* 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	L1312901-21 Water 06-JUN-13 09:49 P1	L1312901-22 Water 04-JUN-13 09:37 P4	L1312901-23 Water 04-JUN-13 17:20 DUPLICATE 1	L1312901-24 Water 05-JUN-13 12:48 DUPLICATE 2	L1312901-25 Water 05-JUN-13 13:32 FIELD BLANK
Grouping	Analyte					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.00092	0.00093	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	5.66	6.71	1.66	3.67	<0.050
	Silver (Ag)-Total (mg/L)	0.000086	0.000117	<0.000010	0.000018	<0.000010
	Sodium (Na)-Total (mg/L)	0.918	0.926	0.533	1.04	<0.050
	Strontium (Sr)-Total (mg/L)	0.105	0.102	0.0270	0.0493	<0.00020
	Thallium (Tl)-Total (mg/L)	0.000049	0.000058	<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)	0.037	0.059	<0.010	<0.010	<0.010
	Uranium (U)-Total (mg/L)	0.000836	0.000863	0.000554	0.00106	<0.000010
	Vanadium (V)-Total (mg/L)	0.0110	0.0136	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.0469	0.0564	0.0032	0.0705	<0.0030
	Zirconium (Zr)-Total (mg/L)	<0.00080	0.00104	<0.00080	<0.00080	<0.00080
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0281	0.0285	0.0457	0.0895	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	0.00026	0.00027	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00065	0.00066	0.00015	0.00101	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.0422	0.0410	0.0105	0.0152	<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)	0.000078	0.000078	<0.000010	0.000023	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	23.0	22.5	4.36	10.9	<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	0.00013	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00202	0.00233	0.00059	0.00108	<0.00020
	Iron (Fe)-Dissolved (mg/L)	0.085	0.109	0.071	0.134	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.000098	0.000132	0.000155	0.000338	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.00128	0.00124	<0.00050	<0.00050	<0.00050
	Magnesium (Mg)-Dissolved (mg/L)	6.65	6.25	0.568	3.08	<0.0050
	Manganese (Mn)-Dissolved (mg/L)	0.0126	0.0126	0.00141	0.0219	<0.000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000847	0.000880	<0.000050	0.000071	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00378	0.00355	<0.00050	0.00081	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	0.771	0.900	0.725	0.445	<0.050
	Selenium (Se)-Dissolved (mg/L)	0.00071	0.00069	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	2.18	2.13	1.49	3.36	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010

* 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				
	L1312901-26 Water TRAVEL BLANK				
Grouping	Analyte				
WATER					
Total Metals	Selenium (Se)-Total (mg/L)	<0.00010			
	Silicon (Si)-Total (mg/L)	<0.050			
	Silver (Ag)-Total (mg/L)	<0.000010			
	Sodium (Na)-Total (mg/L)	<0.050			
	Strontium (Sr)-Total (mg/L)	<0.00020			
	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)	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.0010			
	Zinc (Zn)-Total (mg/L)	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.00080			
Dissolved Metals	Dissolved Metals Filtration Location				
	Aluminum (Al)-Dissolved (mg/L)				
	Antimony (Sb)-Dissolved (mg/L)				
	Arsenic (As)-Dissolved (mg/L)				
	Barium (Ba)-Dissolved (mg/L)				
	Beryllium (Be)-Dissolved (mg/L)				
	Bismuth (Bi)-Dissolved (mg/L)				
	Boron (B)-Dissolved (mg/L)				
	Cadmium (Cd)-Dissolved (mg/L)				
	Calcium (Ca)-Dissolved (mg/L)				
	Chromium (Cr)-Dissolved (mg/L)				
	Cobalt (Co)-Dissolved (mg/L)				
	Copper (Cu)-Dissolved (mg/L)				
	Iron (Fe)-Dissolved (mg/L)				
	Lead (Pb)-Dissolved (mg/L)				
	Lithium (Li)-Dissolved (mg/L)				
	Magnesium (Mg)-Dissolved (mg/L)				
	Manganese (Mn)-Dissolved (mg/L)				
	Molybdenum (Mo)-Dissolved (mg/L)				
	Nickel (Ni)-Dissolved (mg/L)				
	Phosphorus (P)-Dissolved (mg/L)				
	Potassium (K)-Dissolved (mg/L)				
	Selenium (Se)-Dissolved (mg/L)				
	Silicon (Si)-Dissolved (mg/L)				
	Silver (Ag)-Dissolved (mg/L)				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1312901-1	L1312901-2	L1312901-3	L1312901-4	L1312901-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	05-JUN-13	05-JUN-13	04-JUN-13	05-JUN-13	06-JUN-13
		Sampled Time	16:00	12:48	12:27	13:14	09:14
		Client ID	V8	V17A	V20A	VR	VGMAIN
Grouping	Analyte						
WATER							
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	1.53	0.986	1.34	0.964	1.43	
	Strontium (Sr)-Dissolved (mg/L)	0.115	0.0468	0.189	0.0210	0.107	
	Thallium (Tl)-Dissolved (mg/L)	0.000038	<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)	0.00205	0.000896	0.000737	0.000643	0.00224	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0060	0.0627	<0.0010	0.0019	0.0139	
	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	L1312901-6	L1312901-7	L1312901-8	L1312901-9	L1312901-10
Description	Water	Water	Water	Water	Water	Water
Sampled Date	05-JUN-13	05-JUN-13	05-JUN-13	05-JUN-13	04-JUN-13	04-JUN-13
Sampled Time	15:21	15:35	08:34	11:58	16:41	
Client ID	VW1	VW2	VW3	FC	R1	
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	1.73 ^{DTC}	1.99	0.944	0.540	0.807
	Strontium (Sr)-Dissolved (mg/L)	0.120	0.220	0.0489	0.0102	0.0546
	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)	0.00137	0.00361	0.000834	0.000171	0.000612
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0075	0.0037	0.0433	0.0051	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	L1312901-11	L1312901-12	L1312901-13	L1312901-14	L1312901-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	04-JUN-13	04-JUN-13	04-JUN-13	04-JUN-13	04-JUN-13
		Sampled Time	10:50	11:19	10:15	14:53	14:21
		Client ID	R4	R5	R6	W10	X14
Grouping	Analyte						
WATER							
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	0.929	1.09	0.707	1.07	1.02	
	Strontium (Sr)-Dissolved (mg/L)	0.0535	0.0536	0.0434	0.0265	0.0581	
	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)	0.000414	0.000436	0.000487	0.000173	0.000489	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0070	0.0049	<0.0010	0.0045	0.0065	
	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	L1312901-16	L1312901-17	L1312901-18	L1312901-19	L1312901-20	
Description	Water	Water	Water	Water	Water	
Sampled Date	04-JUN-13	05-JUN-13	05-JUN-13	04-JUN-13	04-JUN-13	
Sampled Time	14:53	13:46	14:46	17:11	09:19	
Client ID	NWID	USFR	GCULV	K8	A1	
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	19.2	0.675	0.697	0.519	0.860
	Strontium (Sr)-Dissolved (mg/L)	1.88	0.0212	0.0219	0.0257	0.0470
	Thallium (Tl)-Dissolved (mg/L)	0.00042	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.10 ^{DLA}	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00370	0.000392	0.000429	0.000489	0.000474
	Vanadium (V)-Dissolved (mg/L)	<0.010 ^{DLA}	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	76.1	0.0021	0.0071	0.0037	0.0047
	Zirconium (Zr)-Dissolved (mg/L)	<0.0080 ^{DLA}	<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	L1312901-21	L1312901-22	L1312901-23	L1312901-24	L1312901-25
		Description	Water	Water	Water	Water	Water
		Sampled Date	06-JUN-13	04-JUN-13	04-JUN-13	05-JUN-13	05-JUN-13
		Sampled Time	09:49	09:37	17:20	12:48	13:32
		Client ID	P1	P4	DUPLICATE 1	DUPLICATE 2	FIELD BLANK
Grouping	Analyte						
WATER							
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	0.865	0.843	0.519	0.980	0.167 ^{DTC}	
	Strontium (Sr)-Dissolved (mg/L)	0.0967	0.0912	0.0258	0.0461	<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)	0.000622	0.000557	0.000469	0.000887	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0060	0.0053	0.0014	0.0623	<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	L1312901-26			
Description	Water				
Sampled Date					
Sampled Time					
Client ID	TRAVEL BLANK				
Grouping	Analyte				
WATER					
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)				
	Strontium (Sr)-Dissolved (mg/L)				
	Thallium (Tl)-Dissolved (mg/L)				
	Tin (Sn)-Dissolved (mg/L)				
	Titanium (Ti)-Dissolved (mg/L)				
	Uranium (U)-Dissolved (mg/L)				
	Vanadium (V)-Dissolved (mg/L)				
	Zinc (Zn)-Dissolved (mg/L)				
	Zirconium (Zr)-Dissolved (mg/L)				

* 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)
Duplicate	Cadmium (Cd)-Total	DLM	L1312901-19, -20, -21, -22, -23, -24
Duplicate	Cadmium (Cd)-Total	DLM	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1312901-1, -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	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Potassium (K)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1312901-19, -20, -21, -22, -23, -24
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1312901-19, -20, -21, -22, -23, -24
Matrix Spike	Strontium (Sr)-Total	MS-B	L1312901-19, -20, -21, -22, -23, -24
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1312901-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Dissolved Organic Carbon	MS-B	L1312901-1, -2
Matrix Spike	Total Organic Carbon	MS-B	L1312901-2
Matrix Spike	Total Organic Carbon	MS-B	L1312901-10, -18, -3, -4, -5, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DLM	Detection Limit Adjusted For Sample Matrix Effects
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
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-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
ALK-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.			

Reference Information

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)".			
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.			
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. Waston 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 "Phosphorous". 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."			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			



ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alslab.ca

COC # _____
Page _____ of _____

Report To	EDI	Report Format / Distribution	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other	Service Requested (rush for routine analysis subject to availability)	<input checked="" type="checkbox"/> Regular (Standard Turnaround Times - Business Days)
Company:	Meghan Maginovic	<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax	<input type="checkbox"/> Fax	<input type="checkbox"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	<input type="checkbox"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Contact:	2195 - 2nd Ave	Email 1: mmalinovic@edynamics.com		<input type="checkbox"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Address:	Y1A 3A2	Email 2:		Analysis Request	
Phone:	867-393-4892	Email 3:		Please indicate below Filtered, Preserved or both (F, P, F/P)	
Invoice To	Same as Report ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Client / Project Information		F/P	P
Handcopy of Invoice with Report?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Job #:		F/P	P
Company:	Environmental Dynamics Inc	PO / A/E:		F/P	P
Contact:	Shannon Jenner sjenner@edynamics.com	I.S.D.:		F/P	P
Address:	2195 - 2nd Ave, Y1A 3A2	Quote #:		F/P	P
Phone:	867-393-4882	ALS Contact:		F/P	P
Fax:		ALS Contact:		F/P	P

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (h:mm)	Sample Type	ALK-PCT-VA	ANIONS-ALL-IC-WR	DOC/DKN/TDN/TP/DNH	TOC/COD/TKN/TP/NH3/P	TSS-VA, TDS-VA	PH-MAN-WR	EC-MAN-WR	MET-D-BCMDG-A	MET-T-BCMDG-VA	Number of Containers
R4		04-Jun-13	10:50	Water	X	X	X	X	X	X	X	X	X	5
R5		04-Jun-13	11:19	Water	X	X	X	X	X	X	X	X	X	5
R6		04-Jun-13	10:15	Water	X	X	X	X	X	X	X	X	X	5
W10		04-Jun-13	14:53	Water	X	X	X	X	X	X	X	X	X	5
X14		04-Jun-13	14:21	Water	X	X	X	X	X	X	X	X	X	5

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

Please format data according to CH2M HILL requirements for Faro (talk to Brian).
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 com

SHIPMENT RELEASE (client use) SHIPMENT RECEPTION (ALS use only) SHIPMENT VERIFICATION

Collected by: Meghan Maginovic Date (dd-mm-yy): 5-Jun-13 Time (h:mm): 14:30 Received by: Date: Time: Temperature: °C Verified by: Date:

1 user / row
If Yes add SIF

L1312901-COFC



GENF 1801 Front



ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 688 9878
www.alsglobal.com

COC #

Page of

Report To	EDI	Report Format / Distribution	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other
Company	Meghan Marinovic	<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax	Service Requested (rush for routine analysis & subject to availability)
Contact	2195 - 2nd Ave	Email 1: mmarinovic@edydynamics.com	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)
Address	Y1A 3A2	Email 2:	<input type="radio"/> Priority (2-4 business days) - 50% surcharge - Contact ALS to Confirm TAT
Phone	867-393-4892	Client / Project Information	<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Invoice To	Same as Report ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	PO / A/E:	<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Quote #:	
Company	Environmental Dynamics Inc.	ALS Contact:	
Contact	Shannon Jenner shannon@edydynamics.com	Sampler:	
Address	2195 - 2nd Ave, Y1A 3A2	Date (dd-mm-yy)	Time (hh:mm)
Phone	867-393-4892	Sample Type	Sample Type

Sample #	Sample Identification (This description will appear on the report)	Date	Time	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
	WWID	04-Jun-13	14:53	Water	X	X	X	X	X	X	X	X	X	5
	USFR	05-Jun-13	13:46	Water	X	X	X	X	X	X	X	X	X	5
	SCULV	05-Jun-13	14:46	Water	X	X	X	X	X	X	X	X	X	5
	K9	04-Jun-13	17:11	Water	X	X	X	X	X	X	X	X	X	5
	M1	04-Jun-13	9:19	Water	X	X	X	X	X	X	X	X	X	5

Special Instructions / Regulations with water or land use (CME-Freshwater Aquatic Life/B/C CSR - Commercial/LAB Tier 1 - Natural, etc) / H

Please format data according to CH2M HILL requirements for Faro (talk to Brian)

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 file. Also provided on another Excel file are the ALS location addresses, phone numbers and sample container/presentation/holding time table for SHIPMENT RELEASE (date time) SHIPMENT RECEPTION (date time) SHIPMENT ANALYSIS (date time)

Released by: Meghan Marinovic Date (mm/dd/yyyy): 6-Jun-13 Time (hh:mm): 14:30 Received by: Date: Time: Temperature: °C Verified by: Date:

FORM 1/04 / H Yes Add SIF
GENR 18.01 Font

L1312901-COFC





ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 698 9878
www.alsglobal.com

COC # _____
Page _____ of _____

Report To	EDI	Report Format / Distribution	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other
Company	Meghan Marjanovic	<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax	
Contact	2195 - 2nd Ave	Email 1:	mmarjanovic@edynamics.com
Address	Y1A 3A2	Email 2:	
Phone:	867-393-4892	Fac:	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
Invoice To	Same as Report ?	Client / Project Information	Job #: Faro Surface WQ 13-Y-0199
Handcopy of Invoice with Report?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	PO / A/E:	
Company:	Environmental Dynamics Inc	Quote #:	
Contact:	Shannon Jenner sjenner@edynamics.com	ALS Contact:	
Address:	2195 - 2nd Ave, Y1A 3A2	Sampler:	
Phone:	867-393-4892	Date (dd-mm-yy)	06-Jun-13
Lab Work Order # (Lab Use Only)		Time (hh:mm)	9:49

Sample	Sample Identification (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Analysis Request	Number of Containers
P1		06-Jun-13	9:49	Water	ALK-PCT-VA ANIONS-ALL-IC-WR DOC/DKN/TDN/TDP/DNH TOC/COD/TKN/TN/TP/NH3/R TSS-VA-TDS-VA PH-MAN-WR EC-MAN-WR MET-D-BCMDG-A MET-T-BCMDG-VA	5
P2		04-Jun-13	9:37	Water		5
	Duplicate 1	04-Jun-13	17:20	Water		5
	Duplicate 2	05-Jun-13	12:48	Water		5
	Field Blank	05-Jun-13	13:32	Water		5
	Travel Blank			Water		5

Special Instructions / Regulations with water or land use (GC/IE, Freshwater Aquatic Life/B/C CSR - Commercial/LAB Tier 1 - Natur)

Please format data according to CH2M HILL requirements for Faro (talk to Bienn).

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 page provided on another Excel tab are the ALS location addresses, phone numbers and sample container/preservation/holding instructions.

SHIPMENT RELEASE (Lab Use Only) Released by: Meghan Marjanovic Date (mm/dd/yyyy): 6-Jun-13 Time (hh:mm): 14:30

SHIPMENT RECEPTION (Lab Use Only) Received by: _____ Date: _____ Time: _____ Temperature: _____ Verified by: _____

L1312901-COFC

