ENVIRONMENTAL DYNAMICS INC.

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August 22, 2014

EDI Job Number: 14-Y-0270

Assessment and Abandoned Mines
Yukon Government
Box 2703, K-419
Whitehorse, YT Y1A 2C6

Attention: Erik Pit, Type II Project Manager

Re: Rose Creek Monitoring Program – July 21 to 23, 2014

Assessment and Abandoned Mines (AAM) retained EDI Environmental Dynamics Inc. (EDI) to conduct water quality sampling at the Faro Mine Site. The Rose Creek Monitoring Program has been ongoing since November 2013 in response to changing water quality conditions. Table 1, attached, summarizes the field trips completed for the 2014 fiscal year. The intent of this memo is to summarize field data obtained during the July 21-23, 2014 field trip.

The objectives of the trip were:

- Collect surface water samples at all ten monitoring sites, including QA/QC samples; and,
- Calculate stream discharge at three of the ten sites (NF2, NF2-A and X2).

This trip was conducted in combination with the AAM Faro Pelly Aquatics field program. Weather conditions were variable. July 21 and 22 were calm, mainly sunny, with some cloudy periods and air temperatures ranging from 9 to 24°C. July 23 was overcast with a light wind and air temperatures near 13°C.

The trip objectives were completed as planned at the specified sites. Figure 1 provides the locations of all sampling sites. Table 2 summarizes in-situ water quality data collected. A Swoffer velocity meter was used to measure velocities across the stream transect. Tables 3 to 5 provide hydrology data (i.e., velocity measurements and calculated discharge) for each site. Figures 2 to 4 provide a water depth cross-section at each of the discharge sites. Representative photos of each site and the ALS laboratory analytical reports for all water chemistry samples submitted during this field trip are also attached.

If you have any questions, please do not hesitate to contact me at (867) 393-4882 or through email at mkearns@edynamics.com.

Yours truly,

EDI Environmental Dynamics Inc.

Submitted via email

Meighan Kearns, B.Sc., R.P.Bio.
Aquatic Biologist

Attachments:

- Table 1. Summary of field trips conducted in the 2014 fiscal year, Rose Creek Monitoring Program.
- Table 2. Surface water sampling field data, Rose Creek Monitoring Program, July 21-22, 2014.
- Table 3. Discharge site locations, Rose Creek Monitoring Program, July 23, 2014.
- Table 4. Velocity data and calculated discharge, site NF2, Rose Creek Monitoring Program, July 23, 2014.
- Table 5. Velocity data and calculated discharge, site NF2-A, Rose Creek Monitoring Program, July 23, 2014.
- Table 6. Velocity data and calculated discharge, site X2, Rose Creek Monitoring Program, July 23, 2014.
- Figure 1. Location of surface water sampling, Rose Creek Monitoring Program, July 21-22, 2014.
- Figure 2. Water depth cross-section, site NF2, Rose Creek Monitoring Program, July 23, 2014.
- Figure 3. Water depth cross-section, site NF2-A, Rose Creek Monitoring Program, July 23, 2014.
- Figure 4. Water depth cross-section, site X2, Rose Creek Monitoring Program, July 23, 2014.
- Photos 1 – 13. Representative site photos.
- ALS Laboratory Analytical Reports

Table 1. Summary of field trips conducted in the 2014 fiscal year, Rose Creek Monitoring Program.

Field Date	General Tasks
April 01, 2014	• Surface water sampling
April 08, 2014	• Surface water sampling
April 15, 2014	• Surface water sampling
April 22, 2014	• Surface water sampling
April 29, 2014	• Surface water sampling
May 06, 2014	• Surface water sampling
May 13, 2014	• Surface water sampling
May 20, 2014	• Surface water sampling
May 26-27, 2014	• Surface water sampling; AAM Faro Pelly Aquatics Program combo trip
June 09,2014	• Surface water sampling
June 23-24, 2014	• Surface water sampling; AAM Faro Pelly Aquatics Program combo trip
July 07, 2014	• Surface water sampling; • Stream discharge (NF2, NF2-A, X2)
July 21-22, 2014	• Surface water sampling; AAM Faro Pelly Aquatics Program combo trip • Stream discharge (NF2, NF2-A, X2)

Table 2. Surface water sampling field data, Rose Creek Monitoring Program, July 21-22, 2014.

	UTM Location		Sample		QA/ QC	In-situ Parameters			
Site ID	Easting	Northing	Date	Time	Rep. ID	Temp (°C)	SPC (µS/cm)	pH	Turbidity (NTU)
NF1	584900	6913261	21-Jul-14	16:57	-	11.0	184.0	7.29	1.84
NF2	584689	6913013	21-Jul-14	16:14	-	9.1	193.1	7.58	2.01
NF2-A	584711	6913041	21-Jul-14	15:45	-	8.8	180.4	7.61	1.78
NF2-B	584725	6913029	21-Jul-14	16:00	-	9.0	175.1	7.64	1.62
R3	575260	6916832	22-Jul-14	10:48	-	9.2	411.4	8.04	1.11
R10	585104	6913483	21-Jul-14	17:18	-	10.7	172.8	7.94	0.99
X2	584071	6912767	21-Jul-14	15:21	X2-r	8.9	185.5	7.81	1.44
X3A	583155	6912538	21-Jul-14	14:51	-	10.3	201.4	8.05	1.35
X10	579415	6914869	21-Jul-14	14:32	-	10.7	211.3	8.24	1.25
X14	579341	6915081	21-Jul-14	14:14	-	10.7	442.4	7.52	1.85

Where, UTM = Universal Transverse Mercator (NAD 83/ Zone 8);
QA/QC Rep = Quality Assurance/ Quality Control Replicate;
Temp = water temperature; and,
SPC = specific conductance.

Table 3. Discharge site locations, Rose Creek Monitoring Program, July 23, 2014.

Site ID	UTM Location		Date	Time	Channel Width (m)	Wetted Width (m)
	Easting	Northing				
NF2	584650	6912985	23-Jul-14	12:40	6.63	5.30
NF2-A	584698	6913025	23-Jul-14	11:57	3.18	2.84
X2	584072	6912767	23-Jul-14	09:00	5.66	5.27

Where, UTM = Universal Transverse Mercator (NAD 83/ Zone 8)

Table 4. Velocity data and calculated discharge, site NF2, Rose Creek Monitoring Program, July 23, 2014.

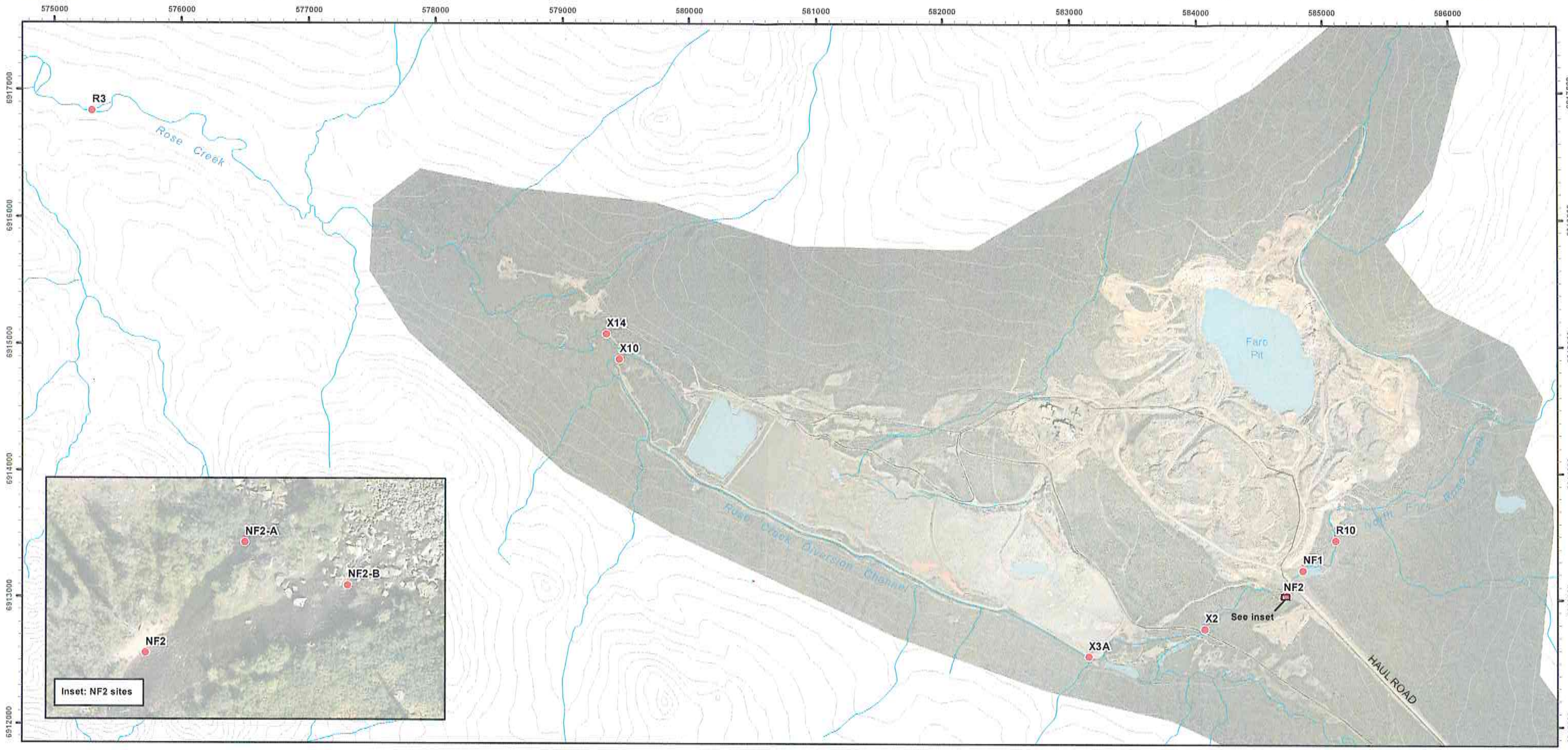
Station Number	Panel Distance (m)	Depth (m)	Panel Velocity (m/s)
0	0.00	0.00	0.00
1	0.25	0.09	0.08
2	0.50	0.12	0.26
3	0.75	0.15	0.18
4	1.00	0.24	0.34
5	1.25	0.22	0.44
6	1.50	0.25	0.39
7	1.75	0.27	0.40
8	2.00	0.28	0.56
9	2.25	0.26	0.59
10	2.50	0.29	0.60
11	2.75	0.33	0.55
12	3.00	0.32	0.62
13	3.25	0.35	0.59
14	3.50	0.39	0.58
15	3.75	0.34	0.56
16	4.00	0.35	0.66
17	4.25	0.41	0.36
18	4.50	0.42	0.59
19	4.75	0.42	0.58
20	5.00	0.45	0.50
21	5.25	0.45	0.53
22	5.50	0.42	0.66
23	5.75	0.47	0.59
24	6.00	0.46	0.53
25	6.25	0.36	0.32
26	6.26	0	0.00
		Discharge	**1.032 m^3/s**

Table 5. Velocity data and calculated discharge, site NF2-A, Rose Creek Monitoring Program, July 23, 2014.

Station Number	Panel Distance (m)	Depth (m)	Panel Velocity (m/s)
0	0.00	0.00	0.000
1	0.10	0.28	0.001
2	0.20	0.47	0.001
3	0.30	0.96	0.001
4	0.40	0.91	0.041
5	0.50	0.90	0.061
6	0.60	0.91	0.070
7	0.70	0.91	0.105
8	0.80	0.92	0.080
9	0.90	0.93	0.150
10	1.00	0.94	0.140
11	1.10	0.95	0.170
12	1.20	0.95	0.180
13	1.30	0.95	0.160
14	1.40	0.95	0.160
15	1.50	0.94	0.170
16	1.60	0.95	0.165
17	1.70	0.93	0.125
18	1.80	0.96	0.120
19	1.90	0.94	0.110
20	2.00	0.94	0.095
21	2.10	0.97	0.105
22	2.20	0.96	0.090
23	2.30	0.96	0.085
24	2.40	0.94	0.040
25	2.50	0.86	0.035
26	2.60	0.85	0.056
27	2.70	0.70	0.020
28	2.80	0.11	0.020
29	2.84	0.00	0.000
		Discharge	**0.237 m^3/s**

Table 6. Velocity data and calculated discharge, site X2, Rose Creek Monitoring Program, July 23, 2014.

Station Number	Panel Distance (m)	Depth (m)	Panel Velocity (m/s)
0	0.00	0.00	0.00
1	0.17	0.06	0.34
2	0.37	0.12	0.52
3	0.57	0.19	0.73
4	0.77	0.18	0.67
5	0.97	0.24	0.52
6	1.17	0.27	0.55
7	1.37	0.31	0.84
8	1.57	0.31	1.04
9	1.77	0.33	1.02
10	1.97	0.35	0.92
11	2.17	0.34	1.00
12	2.37	0.31	1.06
13	2.57	0.34	0.22
14	2.77	0.30	0.88
15	2.97	0.29	1.21
16	3.17	0.31	1.05
17	3.37	0.37	0.58
18	3.57	0.36	0.35
19	3.77	0.30	0.30
20	3.97	0.36	0.58
21	4.07	0.42	0.16
22	4.27	0.45	0.12
23	4.47	0.38	0.75
24	4.67	0.15	0.18
25	4.87	0.14	0.11
26	5.07	0.12	0.09
27	5.27	0.06	0.00
28	5.28	0.00	0.00
		Discharge	**0.914 m^3/s**



Location of surface water sampling, [illegible], [illegible]ly 21-22 2014

Legend

- Surface Water Sample Collected
- Road (Mine Access/Haul)
- Topographic Contour (30 m Interval)

N
W E
S

0 500 1,000 1,500 2,000
metres

Map Scale = 1:30,000 (printed on 11 x 17)
Map Projection: North American Datum 1983 UTM Zone 8N

Data sources

1:50,000 topographic spatial data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

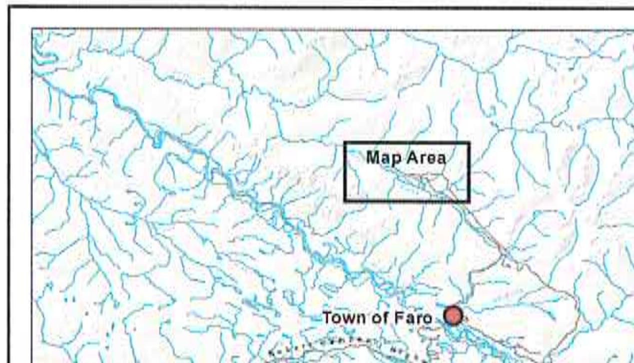
National Road Network courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Detailed toppgraphic features of the Faro, Grum and Vangorda mine sites were provided by Yukon Government - Energy, Mines and Resources - Assessment and Abandoned Mines Branch (March 2012).

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

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

Drawn: LG	Checked: MK	FIGURE 1	Date: 29/04/2014



Map Prepared by
EDI Environmental Dynamics Inc.

Path: J:\Yukon\Projects\2014\14_Y_0270_AAM_Faro_RCSampling\Mapping\Fig1_WaterSampling_01Apr2014.mxd

Figure 2. Water depth cross-section, site NF2, Rose Creek Monitoring Program, July 23, 2014.

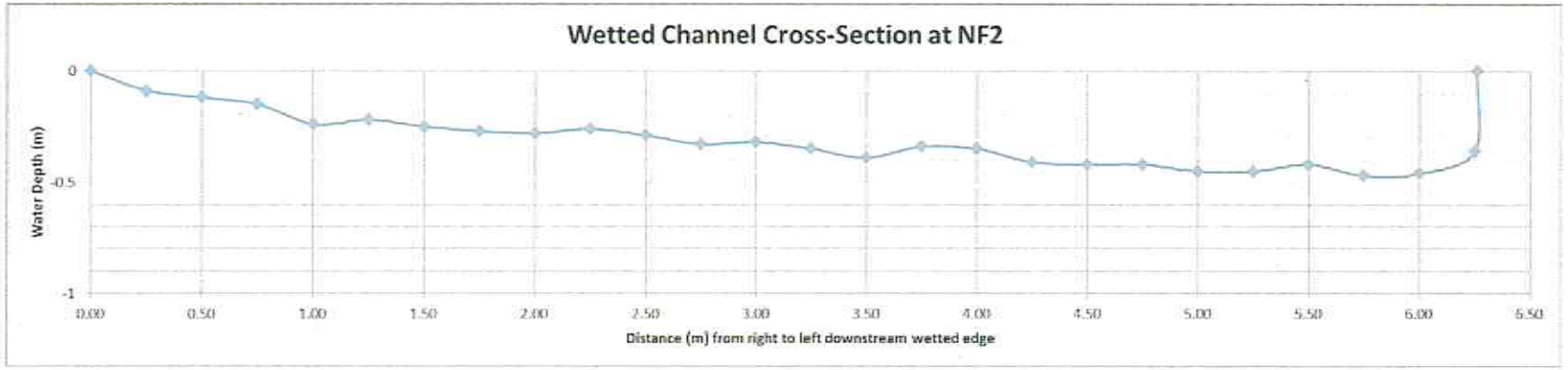


Figure 3. Water depth cross-section, site NF2-A, Rose Creek Monitoring Program, July 23, 2014.

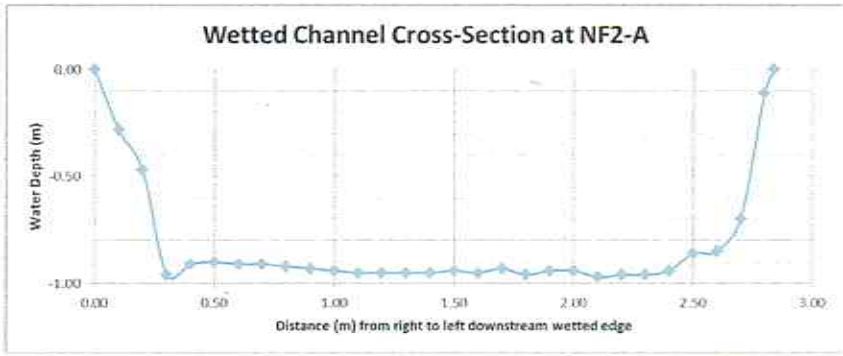
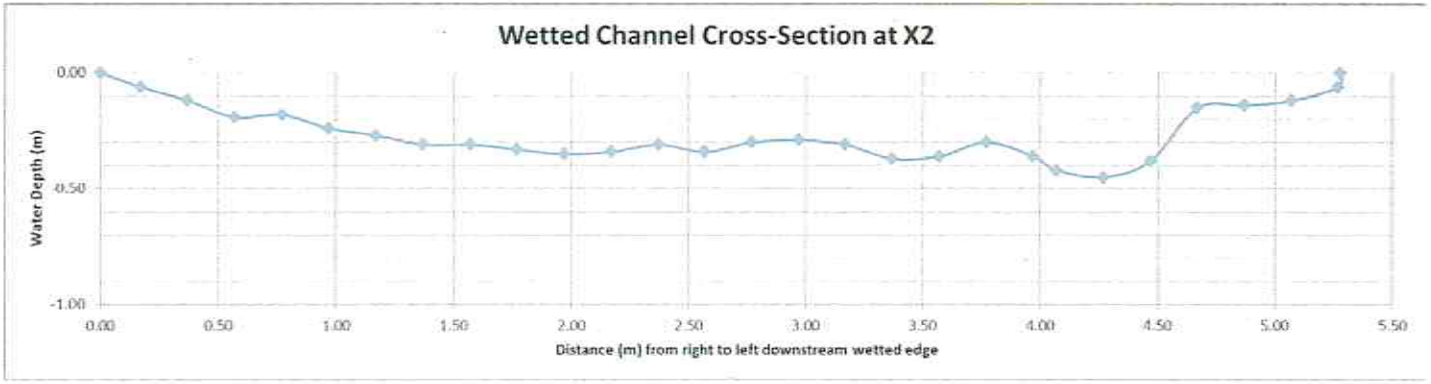


Figure 4. Water depth cross-section, site X2, Rose Creek Monitoring Program, July 23, 2014.



Site Photos

Site ID	Photo No.
NF1	1
NF2	2, 3
NF2-A	4, 5
NF2-B	6
R3	7
R10	8
X2	9, 10
X3A	11
X10	12
X14	13

Photo 1. Upstream view from surface water sampling site NF1, July 21, 2014.

Photo 2. Overview of surface water sampling site NF2, July 21, 2014.

Photo 3. Upstream view of hydrology transect at site NF2, July 23, 2014.

Photo 4. Upstream view of surface water sampling site NF2-A, July 21, 2014.

Photo 5. Upstream view of hydrology transect at site NF2-A, July 23, 2014.

Photo 6. Downstream view of surface water sampling site NF2-B, July 21, 2014.

Photo 7. Upstream view of surface water sampling site R3, July 22, 2014.

Photo 8. Upstream view from surface water sampling site R10, July 21, 2014.

Photo 9. Upstream view of surface water sampling site X2, July 21, 2014.

Photo 10. Upstream view of hydrology transect at site X2, July 23, 2014.

Photo 11. View towards left downstream bank from surface water sampling site X3A, July 21, 2014.

Photo 12. Upstream view of surface water sampling site X10, July 21, 2014.

Photo 13. View towards left downstream bank from surface water sampling site X14, July 21, 2014.

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

Date Received: 24-JUL-14
Report Date: 07-AUG-14 17:57 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1491715

Project P.O. #: NOT SUBMITTED
Job Reference: 14-Y-270
C of C Numbers: 1, 2
Legal Site Desc:

Can Dang
Senior Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1491715-1 Water 21-JUL-14 16:00 NF2B	L1491715-2 Water 21-JUL-14 16:14 NF2	L1491715-3 Water 21-JUL-14 15:45 NF2A	L1491715-4 Water 21-JUL-14 15:21 X2-R	L1491715-5 Water 21-JUL-14 15:11 X2
WATER						
Physical Tests	Conductivity (uS/cm)	165	180	173	181	183
	Hardness (as CaCO3) (mg/L)	85.3	88.2	90.4	92.3	91.2
	pH (pH)	7.94	7.85	7.87	7.93	7.95
	Total Suspended Solids (mg/L)	2.8	1.6	1.8	1.6	2.0
	Total Dissolved Solids (mg/L)	101	108	106	108	109
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	87.7	90.7	89.1	88.5	90.6
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.096	0.101	0.101	0.101	0.099
	Nitrate (as N) (mg/L)	0.0350	0.0361	0.0372	0.0328	0.0322
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0058	0.0043	0.0036	0.0045	0.0037
	Sulfate (SO4) (mg/L)	11.8	15.7	14.7	16.4	16.4
	Anion Sum (meq/L)	2.00	2.15	2.09	2.12	2.16
	Cation Sum (meq/L)	1.81	1.91	1.93	1.97	1.94
	Cation - Anion Balance (%)	-5.1	-5.8	-4.1	-3.7	-5.2
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.47	2.47	2.52	2.48	2.56
	Total Organic Carbon (mg/L)	2.72	2.63	2.61	2.53	2.58
Total Metals	Aluminum (Al)-Total (mg/L)	0.0678	0.0522	0.0530	0.0415	0.0424
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00083	0.00073	0.00074	0.00070	0.00069
	Barium (Ba)-Total (mg/L)	0.0512	0.0485	0.0541	0.0491	0.0486
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000016	0.000397	0.000175	0.000182	0.000183
	Calcium (Ca)-Total (mg/L)	25.1	25.8	25.5	26.5	26.9
	Chromium (Cr)-Total (mg/L)	0.00022	0.00037	0.00019	0.00017	0.00017
	Cobalt (Co)-Total (mg/L)	0.00012	0.00230	0.00098	0.00102	0.00103
	Copper (Cu)-Total (mg/L)	0.00076	0.00065	0.00069	0.00065	0.00064
	Iron (Fe)-Total (mg/L)	0.295	0.342	0.310	0.278	0.277
	Lead (Pb)-Total (mg/L)	0.00128	0.00115	0.00104	0.000917	0.000937
	Lithium (Li)-Total (mg/L)	0.00372	0.00353	0.00336	0.00401	0.00383
	Magnesium (Mg)-Total (mg/L)	5.27	6.37	5.79	6.06	6.07
	Manganese (Mn)-Total (mg/L)	0.0297	0.144	0.0710	0.0832	0.0839
	Molybdenum (Mo)-Total (mg/L)	0.000534	0.000567	0.000510	0.000538	0.000501

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1491715-6 Water 21-JUL-14 14:32 X10	L1491715-7 Water 21-JUL-14 14:51 X3A	L1491715-8 Water 21-JUL-14 17:18 R10	L1491715-9 Water 21-JUL-14 16:57 NF1	L1491715-10 Water 21-JUL-14 17:45 FIELD BLANK
WATER						
Physical Tests	Conductivity (uS/cm)	199	204	171	171	<2.0
	Hardness (as CaCO3) (mg/L)	106	102	87.0	88.8	<0.50
	pH (pH)	8.02	8.01	7.93	7.83	5.69
	Total Suspended Solids (mg/L)	<1.0	1.2	<1.0	2.6	<1.0
	Total Dissolved Solids (mg/L)	124	118	101	104	<1.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	101	97.3	88.3	89.9	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0076	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.106	0.104	0.097	0.096	<0.020
	Nitrate (as N) (mg/L)	0.0202	0.0250	0.0314	0.0312	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0030	0.0026	0.0046	0.0024	<0.0020
	Sulfate (SO4) (mg/L)	18.9	17.4	11.4	12.3	<0.50
	Anion Sum (meq/L)	2.42	2.31	2.01	2.06	<0.10
	Cation Sum (meq/L)	2.25	2.15	1.84	1.89	<0.10
	Cation - Anion Balance (%)	-3.7	-3.7	-4.4	-4.2	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	2.57	2.56	2.57	2.46 SP	<0.50
	Total Organic Carbon (mg/L)	2.77	2.55	2.62	2.88	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0193	0.0243	0.0252	0.0841	<0.0030
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00050	0.00056	0.00072	0.00085	<0.00010
	Barium (Ba)-Total (mg/L)	0.0518	0.0509	0.0484	0.0513	<0.000050
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.000082	0.000096	0.000014	0.000024	<0.000010
	Calcium (Ca)-Total (mg/L)	31.3	29.2	26.4	26.2	<0.020
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00012	0.00013	0.00027	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00040	0.00050	<0.00010	0.00026	<0.00010
	Copper (Cu)-Total (mg/L)	0.00064	0.00062	0.00059	0.00077	<0.00050
	Iron (Fe)-Total (mg/L)	0.417	0.237	0.185	0.431	<0.010
	Lead (Pb)-Total (mg/L)	0.000337	0.000597	0.000328	0.00210	<0.000050
	Lithium (Li)-Total (mg/L)	0.00305	0.00298	0.00354	0.00360	<0.00050
	Magnesium (Mg)-Total (mg/L)	7.31	6.71	5.44	5.46	<0.0050
	Manganese (Mn)-Total (mg/L)	0.0555	0.0590	0.0195	0.0767	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.000498	0.000433	0.000578	0.000540	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1491715-11
	Description	Water
	Sampled Date	
	Sampled Time	
	Client ID	TRAVEL BLANK
Grouping	Analyte	
WATER		
Physical Tests	Conductivity (uS/cm)	<2.0
	Hardness (as CaCO3) (mg/L)	<0.50
	pH (pH)	5.65
	Total Suspended Solids (mg/L)	<1.0
	Total Dissolved Solids (mg/L)	<1.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050
	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
	Anion Sum (meq/L)	<0.10
	Cation Sum (meq/L)	<0.10
	Cation - Anion Balance (%)	0.0
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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1491715-1	L1491715-2	L1491715-3	L1491715-4	L1491715-5
Description	Water	Water	Water	Water	Water
Sampled Date	21-JUL-14	21-JUL-14	21-JUL-14	21-JUL-14	21-JUL-14
Sampled Time	16:00	16:14	15:45	15:21	15:11
Client ID	NF2B	NF2	NF2A	X2-R	X2
Grouping / **Analyte**					
WATER					
Total Metals					
Nickel (Ni)-Total (mg/L)	0.00063	0.00376	0.00192	0.00192	0.00194
Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total (mg/L)	0.582	0.580	0.600	0.594	0.592
Selenium (Se)-Total (mg/L)	0.00028	0.00022	0.00024	0.00027	0.00023
Silicon (Si)-Total (mg/L)	4.68	5.08	4.79	4.73	4.68
Silver (Ag)-Total (mg/L)	0.000038	<0.000010	0.000020	0.000014	0.000013
Sodium (Na)-Total (mg/L)	1.91	2.00	1.99	1.99	2.01
Strontium (Sr)-Total (mg/L)	0.114	0.113	0.110	0.114	0.117
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total (mg/L)	0.00108	0.00108	0.00107	0.00111	0.00112
Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total (mg/L)	0.0085	0.595	0.241	0.253	0.255
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)	0.0068	0.0132	0.0086	0.0095	0.0097
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00059	0.00057	0.00063	0.00055	0.00055
Barium (Ba)-Dissolved (mg/L)	0.0487	0.0489	0.0486	0.0483	0.0491
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)	0.000013	0.000566 DTC	0.000159	0.000168	0.000168
Calcium (Ca)-Dissolved (mg/L)	25.5	24.2	26.1	27.0	26.6
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00320 DTC	0.00089	0.00096	0.00097
Copper (Cu)-Dissolved (mg/L)	0.00054	0.00051	0.00050	0.00050	0.00048
Iron (Fe)-Dissolved (mg/L)	0.139	0.232	0.184	0.167	0.167
Lead (Pb)-Dissolved (mg/L)	0.000291	0.000440	0.000325	0.000333	0.000321
Lithium (Li)-Dissolved (mg/L)	0.00356	0.00341	0.00356	0.00370	0.00360
Magnesium (Mg)-Dissolved (mg/L)	5.24	6.77	6.13	6.06	5.99
Manganese (Mn)-Dissolved (mg/L)	0.0152	0.185 DTC	0.0623	0.0762	0.0765
Molybdenum (Mo)-Dissolved (mg/L)	0.000483	0.000481	0.000492	0.000484	0.000490
Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00501 DTC	0.00168	0.00189	0.00186
Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved (mg/L)	0.567	0.582	0.593	0.593	0.596

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1491715-6	L1491715-7	L1491715-8	L1491715-9	L1491715-10
Description	Water	Water	Water	Water	Water
Sampled Date	21-JUL-14	21-JUL-14	21-JUL-14	21-JUL-14	21-JUL-14
Sampled Time	14:32	14:51	17:18	16:57	17:45
Client ID	X10	X3A	R10	NF1	FIELD BLANK
Grouping / **Analyte**					
WATER					
Total Metals					
Nickel (Ni)-Total (mg/L)	0.00118	0.00119	<0.00050	0.00075	<0.00050
Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total (mg/L)	0.725	0.711	0.578	0.598	<0.050
Selenium (Se)-Total (mg/L)	0.00026	0.00023	0.00026	0.00024	<0.00010
Silicon (Si)-Total (mg/L)	4.40	4.36	4.88	4.77	<0.050
Silver (Ag)-Total (mg/L)	0.000010	<0.000010	<0.000010	0.000011	<0.000010
Sodium (Na)-Total (mg/L)	1.99	2.01	1.98	1.98	<0.050
Strontium (Sr)-Total (mg/L)	0.144	0.133	0.113	0.112	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total (mg/L)	0.00141	0.00139	0.00110	0.00112	<0.000010
Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total (mg/L)	0.127	0.136	0.0052	0.0119	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Dissolved Metals					
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0066	0.0072	0.0102	0.0082	<0.0010
Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved (mg/L)	0.00037	0.00043	0.00061	0.00068	<0.00010
Barium (Ba)-Dissolved (mg/L)	0.0510	0.0503	0.0480	0.0509	<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)	0.000067	0.000096	0.000011	0.000020	<0.000010
Calcium (Ca)-Dissolved (mg/L)	30.9	30.0	26.2	26.5	<0.020
Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved (mg/L)	0.00034	0.00047	<0.00010	0.00021	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00052	0.00051	0.00049	0.00049	<0.00020
Iron (Fe)-Dissolved (mg/L)	0.293	0.157	0.114	0.249	<0.010
Lead (Pb)-Dissolved (mg/L)	0.000162	0.000239	0.000095	0.000207	<0.000050
Lithium (Li)-Dissolved (mg/L)	0.00295	0.00301	0.00331	0.00349	<0.00050
Magnesium (Mg)-Dissolved (mg/L)	7.10	6.49	5.21	5.53	<0.0050
Manganese (Mn)-Dissolved (mg/L)	0.0505	0.0556	0.0164	0.0866	<0.000050
Molybdenum (Mo)-Dissolved (mg/L)	0.000449	0.000401	0.000490	0.000499	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00114	0.00114	<0.00050	0.00059	<0.00050
Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Dissolved (mg/L)	0.703	0.717	0.539	0.587	<0.050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1491715-11				
		Description	Water				
		Sampled Date					
		Sampled Time					
		Client ID	TRAVEL BLANK				
Grouping	Analyte						
WATER							
Total Metals	Nickel (Ni)-Total (mg/L)		<0.00050				
	Phosphorus (P)-Total (mg/L)		<0.30				
	Potassium (K)-Total (mg/L)		<0.050				
	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)						

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1491715-1 Water 21-JUL-14 16:00 NF2B	L1491715-2 Water 21-JUL-14 16:14 NF2	L1491715-3 Water 21-JUL-14 15:45 NF2A	L1491715-4 Water 21-JUL-14 15:21 X2-R	L1491715-5 Water 21-JUL-14 15:11 X2
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00025	0.00024	0.00025	0.00023	0.00026
	Silicon (Si)-Dissolved (mg/L)	4.59	5.02	4.82	4.75	4.76
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.90	2.00	2.03	1.98	1.99
	Strontium (Sr)-Dissolved (mg/L)	0.108	0.106	0.113	0.110	0.110
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000011	<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)	0.000991	0.00102	0.00103	0.00102	0.00102
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0065	0.871 DTC	0.229	0.249	0.250
	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

Grouping	Analyte	L1491715-6 Water 21-JUL-14 14:32 X10	L1491715-7 Water 21-JUL-14 14:51 X3A	L1491715-8 Water 21-JUL-14 17:18 R10	L1491715-9 Water 21-JUL-14 16:57 NF1	L1491715-10 Water 21-JUL-14 17:45 FIELD BLANK
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00024	0.00024	0.00025	0.00026	<0.00010
	Silicon (Si)-Dissolved (mg/L)	4.25	4.38	4.77	4.77	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.95	1.98	1.89	1.98	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.135	0.135	0.110	0.112	<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)	0.00131	0.00134	0.00103	0.00104	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.117	0.131	0.0041	0.0101	<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	L1491715-11				
	Description	Water				
	Sampled Date					
	Sampled Time					
	Client ID	TRAVEL BLANK				
Grouping	Analyte					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	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	Antimony (Sb)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Iron (Fe)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Phosphorus (P)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Phosphorus (P)-Total	MS-B	L1491715-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1491715-3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Thallium (Tl)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1491715-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
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.
SP	Sample was Preserved at the laboratory

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.

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.

Reference Information

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)".

EC-MAN-WR	Water	Conductivity by Meter	APHA 2510 (B)

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using an electrode.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.

PH-MAN-WR	Water	pH by Meter	APHA 4500-H (B)

"This analysis is carried out using procedures adapted from APHA Method 4500-H ""pH Value"". The pH is determined in the laboratory using a pH electrode."

TDS-CALC-VA	Water	TDS (Calculated)	APHA 1030E (20TH EDITION)

This analysis is carried out using procedures adapted from APHA 1030E "Checking Correctness of Analyses".

TSS-LOW-WR	Water	Total Suspended Solids by Grav. (1 mg/L)	APHA 2540 D

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids are determined by filtering a sample through a glass fibre filter and drying the filter at 104 degrees celsius.

ZR-D-MS-VA Water Dissolved Zr in Water by ICPMS EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

ZR-T-MS-VA Water Total Zr in Water by ICPMS EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

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

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

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

Chain of Custody Numbers:

1 2

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - millligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1491715-COFC

COC Number: 14 -

Page ____ of ____

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	EDI	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Meighan Kearns	Quality Control (QC) Report with Report ☐ Yes ☐ No	P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT
Address:	2195 - 2nd Avenue Whitehorse, YT Y1A 3T8	☐ Criteria on Report - provide details below if box checked Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-393-4882	Email 1 or Fax: mkearns@edynamics.com	Specify Date Required for E2,E or P:
		Email 2: adrienne.turcotte@gov.yk.ca	

Invoice To	Same as Report To ☐ Yes ☑ No	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☑ Yes ☐ No	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	EDI	Email 1 or Fax: sjenner@edynamics.com	
Contact:	S Jenner	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q38556	Approver ID:	Cost Center:
Job #:	14-Y-270	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Sean Sluggett	Sampler: DH + MM

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALK-COL-VA,P-T-COL-VA,IONBALANCE-V	ANIONS-ALL-IC-WR, TDS-CALC-VA	EC-MAN-WR,PH-MAN-WR	TSS-LOW-WR	CARBONS-TOC-VA,NH3-F-VA	CARBONS-DOC-VA	MET-T-CCMS-VA,ZR-T-MS-VA	MET-D-CCMS-VA,ZR-D-MS-VA	HARDNESS-CALC-VA	Number of Containers
	R10	21-Jul-14	17:18	Water	R	R	R	R	R	R	R	R	R	5
	NF1	21-Jul-14	16:57	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Field Blank	21-Jul-14	17:45	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Travel Blank			↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	Use CH2M_EQUIS for EDD.
Are samples for human drinking water use? ☐ Yes ☑ No	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	21 Jul 2014	21:10						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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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 specified on the back page of the white - report copy.