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

Date Received: 23-APR-14
Report Date: 05-MAY-14 16:39 (MT)
Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1446230

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

Can Dang
Senior Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1446230-1	L1446230-2	L1446230-3	L1446230-4	L1446230-5
	Description	Grab	Grab	Grab	Grab	Grab
	Sampled Date	22-APR-14	22-APR-14	22-APR-14	22-APR-14	22-APR-14
	Sampled Time	12:45	12:50	14:45	15:10	15:35
	Client ID	X14	X14-R	X10	X3A	X2
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	841	845	329	326	296
	Hardness (as CaCO3) (mg/L)	446	436	163	163	155
	pH (pH)	7.94	7.95	8.13	8.02	7.91
	Total Suspended Solids (mg/L)	1.6	1.6	6.4	1.2	1.2
	Total Dissolved Solids (mg/L)	579	573	187	187	181
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	193	192	145	143	136
	Ammonia, Total (as N) (mg/L)	0.103	0.0989	<0.0050	<0.0050	<0.0050
	Chloride (Cl) (mg/L)	0.52	0.52	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.151	0.151	0.164	0.179	0.183
	Nitrate (as N) (mg/L)	0.200	0.199	0.246	0.252	0.248
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020	<0.0020	0.0048	0.0044	0.0041
	Sulfate (SO4) (mg/L)	283	282	35.0	35.5	36.0
	Anion Sum (meq/L)	9.79	9.74	3.66	3.63	3.49
	Cation Sum (meq/L)	9.55	9.37	3.44	3.47	3.33
	Cation - Anion Balance (%)	-1.2	-1.9	-3.0	-2.2	-2.4
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	1.58	1.42	1.30	1.45	1.33
	Total Organic Carbon (mg/L)	1.53	1.47	1.39	1.50	1.38
Total Metals	Aluminum (Al)-Total (mg/L)	0.0161	0.0140	0.0273	0.0436	0.0295
	Antimony (Sb)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00036	0.00039	0.00043	0.00056	0.00048
	Barium (Ba)-Total (mg/L)	0.0672	0.0667	0.0917	0.0770	0.0719
	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)	0.000233	0.000246	0.000237	0.000336	0.000501
	Calcium (Ca)-Total (mg/L)	132	129	46.4	44.2	42.7
	Chromium (Cr)-Total (mg/L)	<0.00010	<0.00010	0.00011	0.00021	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00432	0.00435	0.00069	0.00176	0.00300
	Copper (Cu)-Total (mg/L)	0.00067	0.00073	0.00097	0.00130	0.00108
	Iron (Fe)-Total (mg/L)	0.760	0.757	0.174	0.245	0.284
	Lead (Pb)-Total (mg/L)	0.000228	0.000199	0.00177	0.00770	0.000381
	Lithium (Li)-Total (mg/L)	0.00920	0.00901	0.00706	0.00705	0.00847
	Magnesium (Mg)-Total (mg/L)	30.4	29.4	13.5	11.6	11.7
	Manganese (Mn)-Total (mg/L)	5.35	5.29	0.0797	0.158	0.218
	Molybdenum (Mo)-Total (mg/L)	0.000754	0.000777	0.000722	0.000723	0.000826

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1446230-6 Grab 22-APR-14 15:50 NF2-A	L1446230-7 Grab 22-APR-14 16:00 NF2-B	L1446230-8 Grab 22-APR-14 16:10 NF2	L1446230-9 Grab 22-APR-14 17:20 FIELD BLANK	L1446230-10 Grab 23-APR-14 11:55 TRIP BLANK
WATER						
Physical Tests	Conductivity (uS/cm)	363	299	308	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	171	144	154	<0.50	<0.50
	pH (pH)	8.76	7.90	7.96	5.75	5.71
	Total Suspended Solids (mg/L)	8.2	<1.0	<1.0	<1.0	<1.0
	Total Dissolved Solids (mg/L)	216	164	174	<1.0	<1.0
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	127	136	135	<2.0	<2.0
	Ammonia, Total (as N) (mg/L)	0.0451	<0.0050	<0.0050	<0.0050	<0.010 RRV
	Chloride (Cl) (mg/L)	0.62	<0.50	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.183	0.173	0.183	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.930	0.255	0.253	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	0.0082	<0.0010	<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	0.0132	0.0050	0.0047	<0.0020	<0.0020
	Sulfate (SO4) (mg/L)	63.6	23.1	30.5	<0.50	<0.50
	Anion Sum (meq/L)	3.95	3.23	3.35	<0.10	<0.10
	Cation Sum (meq/L)	3.77	3.07	3.30	<0.10	<0.10
	Cation - Anion Balance (%)	-2.3	-2.6	-0.8	0.0	0.0
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	4.88	1.26	1.28	<0.50	
	Total Organic Carbon (mg/L)	5.01	1.41	1.34	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)	0.0788	0.0319	0.0341	<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)	0.00023	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)	0.00097	0.00051	0.00053	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	0.0900	0.0735	0.0766	<0.000050	<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)	0.000097	0.000141	0.000553	<0.000010	<0.000010
	Calcium (Ca)-Total (mg/L)	43.4	40.4	43.7	<0.020	<0.020
	Chromium (Cr)-Total (mg/L)	0.00058	0.00011	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)	0.00182	0.00074	0.00350	<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)	0.00215	0.00118	0.00116	<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)	0.234	0.155	0.222	<0.010	<0.010
	Lead (Pb)-Total (mg/L)	0.00655	0.000389	0.000410	<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)	0.0122	0.00776	0.00847	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	18.0	9.82	11.2	<0.0050	<0.0050
	Manganese (Mn)-Total (mg/L)	0.0905	0.0499	0.206	<0.000050	<0.000050
	Molybdenum (Mo)-Total (mg/L)	0.00130	0.000839	0.000896	<0.000050	<0.000050

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1446230-1	L1446230-2	L1446230-3	L1446230-4	L1446230-5
	Description	Grab	Grab	Grab	Grab	Grab
	Sampled Date	22-APR-14	22-APR-14	22-APR-14	22-APR-14	22-APR-14
	Sampled Time	12:45	12:50	14:45	15:10	15:35
	Client ID	X14	X14-R	X10	X3A	X2
Grouping	**Analyte**					
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	0.0104	0.0105	0.00375	0.00358	0.00483
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	2.23	2.21	1.46	1.30	1.24
	Selenium (Se)-Total (mg/L)	0.00036	0.00040	0.00041	0.00038	0.00041
	Silicon (Si)-Total (mg/L)	6.44	6.26	5.65	5.58	6.13
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	8.36	8.26	3.65	3.32	3.62
	Strontium (Sr)-Total (mg/L)	0.413	0.409	0.212	0.201	0.196
	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)	0.00356	0.00342	0.00270	0.00271	0.00268
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.307	0.310	0.467	0.516	0.723
	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)	0.0025	0.0025	0.0030	0.0074	0.0106
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.00025	0.00025	0.00016	0.00023	0.00026
	Barium (Ba)-Dissolved (mg/L)	0.0673	0.0655	0.0717	0.0726	0.0725
	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)	0.000229	0.000240	0.000219	0.000320	0.000482
	Calcium (Ca)-Dissolved (mg/L)	131	128	45.0	45.9	43.2
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00417	0.00432	0.00059	0.00170	0.00293
	Copper (Cu)-Dissolved (mg/L)	0.00041	0.00043	0.00044	0.00059	0.00074
	Iron (Fe)-Dissolved (mg/L)	0.515	0.546	0.024	0.053	0.085
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000247	0.000075
	Lithium (Li)-Dissolved (mg/L)	0.00908	0.00902	0.00681	0.00768	0.00906
	Magnesium (Mg)-Dissolved (mg/L)	28.8	28.6	12.2	11.8	11.5
	Manganese (Mn)-Dissolved (mg/L)	5.27	5.35	0.0686	0.157	0.217
	Molybdenum (Mo)-Dissolved (mg/L)	0.000719	0.000737	0.000682	0.000736	0.000837
	Nickel (Ni)-Dissolved (mg/L)	0.0103	0.0104	0.00316	0.00341	0.00463
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Dissolved (mg/L)	2.20	2.21	1.26	1.31	1.23

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1446230-6 Grab 22-APR-14 15:50 NF2-A	L1446230-7 Grab 22-APR-14 16:00 NF2-B	L1446230-8 Grab 22-APR-14 16:10 NF2	L1446230-9 Grab 22-APR-14 17:20 FIELD BLANK	L1446230-10 Grab 23-APR-14 11:55 TRIP BLANK
WATER						
Total Metals	Nickel (Ni)-Total (mg/L)	0.00489	0.00139	0.00510	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	<0.30
	Potassium (K)-Total (mg/L)	2.29	1.18	1.21	<0.050	<0.050
	Selenium (Se)-Total (mg/L)	0.00081	0.00041	0.00043	<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)	8.81	6.17	6.06	<0.050	<0.050
	Silver (Ag)-Total (mg/L)	0.000019	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	6.81	3.48	3.59	<0.050	<0.050
	Strontium (Sr)-Total (mg/L)	0.221	0.183	0.194	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	0.000013	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	0.00011	<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)	0.00397	0.00273	0.00279	<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)	0.187	0.176	0.819	<0.0030	<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	
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0148	0.0136	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)	0.00014	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00069	0.00037	0.00037	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.0763	0.0736	0.0751	<0.000050	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000040	0.000156	0.000565	<0.000010	
	Calcium (Ca)-Dissolved (mg/L)	39.2	41.7	43.6	<0.020	
	Chromium (Cr)-Dissolved (mg/L)	0.00011	<0.00010	<0.00010	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00157	0.00069	0.00339	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00108	0.00089	0.00086	<0.00020	
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.046	0.098	<0.010	
	Lead (Pb)-Dissolved (mg/L)	0.000166	0.000079	0.000087	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0120	0.00819	0.00864	<0.00050	
	Magnesium (Mg)-Dissolved (mg/L)	17.8	9.76	11.0	<0.0050	
	Manganese (Mn)-Dissolved (mg/L)	0.0791	0.0480	0.201	<0.000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00124	0.000840	0.000873	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	0.00441	0.00135	0.00503	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.30	<0.30	<0.30	<0.30	
	Potassium (K)-Dissolved (mg/L)	2.28	1.16	1.19	<0.050	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1446230-1 Grab 22-APR-14 12:45 X14	L1446230-2 Grab 22-APR-14 12:50 X14-R	L1446230-3 Grab 22-APR-14 14:45 X10	L1446230-4 Grab 22-APR-14 15:10 X3A	L1446230-5 Grab 22-APR-14 15:35 X2
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00039	0.00041	0.00043	0.00042	0.00042
	Silicon (Si)-Dissolved (mg/L)	6.15	6.20	5.56	5.70	5.97
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	8.10	8.24	3.32	3.39	3.52
	Strontium (Sr)-Dissolved (mg/L)	0.416	0.405	0.202	0.213	0.205
	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)	0.00344	0.00346	0.00259	0.00272	0.00258
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.305	0.310	0.417	0.508	0.735
	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	L1446230-6	L1446230-7	L1446230-8	L1446230-9	L1446230-10
	Description	Grab	Grab	Grab	Grab	Grab
	Sampled Date	22-APR-14	22-APR-14	22-APR-14	22-APR-14	23-APR-14
	Sampled Time	15:50	16:00	16:10	17:20	11:55
	Client ID	NF2-A	NF2-B	NF2	FIELD BLANK	TRIP BLANK
Grouping	**Analyte**					
WATER						
Dissolved Metals	Selenium (Se)-Dissolved (mg/L)	0.00092	0.00046	0.00045	<0.00010	
	Silicon (Si)-Dissolved (mg/L)	7.99	5.87	6.06	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	6.62	3.32	3.40	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.201	0.188	0.194	<0.00020	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Dissolved (mg/L)	0.00392	0.00267	0.00266	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Dissolved (mg/L)	0.0618	0.178	0.826	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	<0.00080	<0.00080	<0.00080	<0.00080	

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

Reference Information

Additional Comments for Sample Listed:

Samplenum	Matrix	Report Remarks	Sample Comments
L1446230-10	Water	Note: ALS blank is past the expiry date Apr29/2014	

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Beryllium (Be)-Dissolved	DLA	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1446230-10
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Calcium (Ca)-Total	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Strontium (Sr)-Total	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8
Matrix Spike	Ammonia, Total (as N)	MS-B	L1446230-1, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

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.

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)".

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity 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-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorous

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

Reference Information

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

It is recommended that this analysis be conducted in the field.

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

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

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

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

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

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

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

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

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

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

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

Chain of Custody Numbers:

1

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 - milligrams 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

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L1446230-COFC

COC Number: 14 -

Page 1 of 1

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	E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
Phone:	867-393-4882	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		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:	Sampler: BSm / CB

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-VA	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
	X14	22APR14	12:45	GRAB	R	R	R	R	R	R	R	R	R	5
	X14-F	22APR14	12:50	GRAB	R	—	—	—	—	—	—	—	F	
	X10	22APR14	14:45	GRAB	R	—	—	—	—	—	—	—	F	
	X3A	22APR14	15:10	GRAB	R	—	—	—	—	—	—	—	F	
	X2	22APR14	15:35	GRAB	R	—	—	—	—	—	—	—	F	
	NF2-A	22APR14	15:50	GRAB	R	—	—	—	—	—	—	—	F	
	NF2-B	22APR14	16:00	GRAB	R	—	—	—	—	—	—	—	F	
	NF2	22APR14	16:10	GRAB	R	—	—	—	—	—	—	—	F	
	Field Blank	22APR14	17:20	—	R	—	—	—	—	—	—	—	F	
	Trip Blank	—	—	—	R	—	—	—	—	—	—	—	F	

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)	SAMPLE CONDITION AS RECEIVED (lab use only)
Are samples taken from a Regulated DW System? ☐ Yes ☐ No	Use CH2M_EQUIS for EDD.	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human drinking water use? ☐ Yes ☐ No		Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5.1					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date: 23/APR/14	Time: 11:55	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0206-v09 Front/04 January 2014

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