



EDI ENVIRONMENTAL DYNAMICS INC.  
ATTN: Lyndsay Doetzel  
2195 - 2nd Ave  
Whitehorse YT Y1A 3T8

Date Received: 08-SEP-16  
Report Date: 23-SEP-16 17:02 (MT)  
Version: FINAL

Client Phone: 867-393-4882

## Certificate of Analysis

Lab Work Order #: L1826315  
Project P.O. #: NOT SUBMITTED  
Job Reference: MOUNT NANSEN 16-Y-0089  
C of C Numbers: 1  
Legal Site Desc:

Comments: Not all analyses could be performed on the samples ALS identify as L1826315-3 and L1826315-4 since the specifically bottles required were not received.

Can Dang  
Senior Account Manager

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## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1826315-1 water 07-SEP-16 12:00 WQ-PC-D	L1826315-2 water 07-SEP-16 16:40 WQ-CH-P-13-01	L1826315-3 water 07-SEP-16 08:40 WQ-NW-SEEP-02	L1826315-4 water TRAVEL BLANK	L1826315-5 water 07-SEP-16 15:50 WQ-VC-UMN(R)
Grouping	Analyte					
<b>WATER</b>						
<b>Physical Tests</b>	Conductivity (uS/cm)	504	1530	487	<2.0	173
	Hardness (as CaCO3) (mg/L)	246	1010	266		103
	pH (pH)	7.51	6.72	7.65	5.68	7.92
	Total Suspended Solids (mg/L)	222	<3.0	21.3	<3.0	3.8
	TDS (Calculated) (mg/L)	333	1330	340	<1.0	130
<b>Anions and Nutrients</b>	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	53.4	10.1	46.5	<1.0	64.2
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0
	Alkalinity, Total (as CaCO3) (mg/L)	53.4	10.1	46.5	<1.0	64.2
	Ammonia, Total (as N) (mg/L)	2.03	0.0075	<0.0050	<0.0050	0.0052
	Bromide (Br) (mg/L)	<0.050	<0.50 <sup>DLDS</sup>	<0.050	<0.050	
	Chloride (Cl) (mg/L)	0.72	<5.0 <sup>DLDS</sup>	0.68	<0.50	<0.50
	Fluoride (F) (mg/L)	0.079	<0.20 <sup>DLDS</sup>	0.363	<0.020	0.086
	Nitrate (as N) (mg/L)	0.0799	0.095 <sup>HTD</sup>	0.0307 <sup>HTD</sup>	<0.0050	0.116
	Nitrite (as N) (mg/L)	0.0052	<0.010 <sup>DLDS</sup>	<0.0010	<0.0010	<0.0010
	Sulfate (SO4) (mg/L)	200	966	213	<0.30	51.9
	Anion Sum (meq/L)	5.27	20.3	5.38	<0.10	2.38
	Cation Sum (meq/L)	5.43	20.6	5.41	<0.10	2.20
	Cation - Anion Balance (%)	1.5	0.7	0.3	0.0	-3.8
	<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050		<0.0050
Cyanide, Total (mg/L)		<0.0050	<0.0050		<0.0050	<0.0050
Cyanate (mg/L)		0.63	<0.20			<0.20
Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50 <sup>SP</sup>	<0.50	<0.50
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	9.49	0.198	0.156	<0.0030	0.0261
	Antimony (Sb)-Total (mg/L)	0.00868	0.00011	0.00399	<0.00010	0.00018
	Arsenic (As)-Total (mg/L)	0.128	0.00051	0.0169	<0.00010	0.00090
	Barium (Ba)-Total (mg/L)	0.306	0.0124	0.00798	<0.000050	0.0595
	Beryllium (Be)-Total (mg/L)	0.000435	0.000039	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Total (mg/L)	0.00103	<0.000050	0.000107	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)	0.00179	0.0105	0.000481	<0.0000050	0.0000190
	Calcium (Ca)-Total (mg/L)	71.9	241	81.9	<0.050	28.1
	Chromium (Cr)-Total (mg/L)	0.00996	0.00016	0.00018	<0.00010	0.00028
	Cobalt (Co)-Total (mg/L)	0.00600	<0.00010	<0.00010	<0.00010	0.00011
	Copper (Cu)-Total (mg/L)	0.0310	0.00112	0.0231	<0.00050	0.00148
	Iron (Fe)-Total (mg/L)	15.6	0.041	0.416	<0.010	0.247
	Lead (Pb)-Total (mg/L)	0.0625	<0.000050	0.00574	<0.000050	<0.000050

\* 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				
	L1826315-6 water 07-SEP-16 13:30 WQ-DC-U-R	L1826315-7 water 07-SEP-16 12:25 FIELD BLANK			
Grouping	Analyte				
<b>WATER</b>					
<b>Physical Tests</b>	Conductivity (uS/cm)	1030	<2.0		
	Hardness (as CaCO3) (mg/L)	618	<0.50		
	pH (pH)	8.10	5.29		
	Total Suspended Solids (mg/L)	119	<3.0		
	TDS (Calculated) (mg/L)	760	<1.0		
<b>Anions and Nutrients</b>	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	173	<1.0		
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<1.0	<1.0		
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<1.0	<1.0		
	Alkalinity, Total (as CaCO3) (mg/L)	173	<1.0		
	Ammonia, Total (as N) (mg/L)	0.427	<0.0050		
	Bromide (Br) (mg/L)	<0.25 <sup>DLDS</sup>	<0.050		
	Chloride (Cl) (mg/L)	<2.5 <sup>DLDS</sup>	<0.50		
	Fluoride (F) (mg/L)	<0.10 <sup>DLDS</sup>	<0.020		
	Nitrate (as N) (mg/L)	0.224	<0.0050		
	Nitrite (as N) (mg/L)	<0.0050 <sup>DLDS</sup>	<0.0010		
	Sulfate (SO4) (mg/L)	433	<0.30		
	Anion Sum (meq/L)	12.5	<0.10		
	Cation Sum (meq/L)	12.9	<0.10		
	Cation - Anion Balance (%)	1.6	0.0		
<b>Cyanides</b>	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050		
	Cyanide, Total (mg/L)	<0.0050	<0.0050		
	Cyanate (mg/L)	<0.20	<0.20		
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50		
<b>Total Metals</b>	Aluminum (Al)-Total (mg/L)	2.09	<0.0030		
	Antimony (Sb)-Total (mg/L)	0.00230	<0.00010		
	Arsenic (As)-Total (mg/L)	0.0276	<0.00010		
	Barium (Ba)-Total (mg/L)	0.0776	<0.000050		
	Beryllium (Be)-Total (mg/L)	0.000083	<0.000020		
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050		
	Boron (B)-Total (mg/L)	0.016	<0.010		
	Cadmium (Cd)-Total (mg/L)	0.000253	<0.0000050		
	Calcium (Ca)-Total (mg/L)	143	<0.050		
	Chromium (Cr)-Total (mg/L)	0.00388	<0.00010		
	Cobalt (Co)-Total (mg/L)	0.00186	<0.00010		
	Copper (Cu)-Total (mg/L)	0.00725	<0.00050		
	Iron (Fe)-Total (mg/L)	5.64	<0.010		
	Lead (Pb)-Total (mg/L)	0.00299	<0.000050		

\* 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		L1826315-1 water 07-SEP-16 12:00 WQ-PC-D	L1826315-2 water 07-SEP-16 16:40 WQ-CH-P-13-01	L1826315-3 water 07-SEP-16 08:40 WQ-NW-SEEP-02	L1826315-4 water TRAVEL BLANK	L1826315-5 water 07-SEP-16 15:50 WQ-VC-UMN(R)
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Lithium (Li)-Total (mg/L)	0.0082	0.0015	0.0014	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	18.4	88.4	15.5	<0.10	8.81
	Manganese (Mn)-Total (mg/L)	1.53	0.227	0.0168	<0.00010	0.0515
	Mercury (Hg)-Total (mg/L)	0.000067	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.00107	<0.000050	0.000176	<0.000050	0.000424
	Nickel (Ni)-Total (mg/L)	0.00806	0.00781	<0.00050	<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)	0.283	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	3.21	0.43	1.69	<0.10	0.66
	Selenium (Se)-Total (mg/L)	0.000235	0.000074	0.000059	<0.000050	0.000064
	Silicon (Si)-Total (mg/L)	24.3	9.17	3.05	<0.050	6.42
	Silver (Ag)-Total (mg/L)	0.00141	<0.000010	0.000127	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	6.42	6.30	0.986	<0.050	2.90
	Strontium (Sr)-Total (mg/L)	0.373	0.505	0.165	<0.00020	0.252
	Sulfur (S)-Total (mg/L)	68.1	324	75.8	<0.50	11.4
	Thallium (Tl)-Total (mg/L)	0.000165	<0.000010	0.000026	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	0.00018	<0.00010	0.00012	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.240	0.00049	0.00196	<0.00030	<0.00030
	Uranium (U)-Total (mg/L)	0.00126	<0.000010	0.000215	<0.000010	0.000479
	Vanadium (V)-Total (mg/L)	0.0269	<0.00050	<0.00050	<0.00050	<0.00050
	Zinc (Zn)-Total (mg/L)	0.172	3.81	0.0329	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	0.00118	<0.00030	<0.00030	<0.00030	<0.00030
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD	LAB		FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	LAB		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0144	0.171	0.0095		0.0256
	Antimony (Sb)-Dissolved (mg/L)	0.00351	0.00011	0.00287		0.00015
	Arsenic (As)-Dissolved (mg/L)	0.0149	0.00043	0.00828		0.00091
	Barium (Ba)-Dissolved (mg/L)	0.119	0.0116	0.00510		0.0608
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	0.000036	<0.000020		<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010		<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000127	0.0101	0.000348		0.0000179
	Calcium (Ca)-Dissolved (mg/L)	71.2	250	80.3		26.9
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		0.00022
	Cobalt (Co)-Dissolved (mg/L)	0.00095	<0.00010	<0.00010		0.00011
	Copper (Cu)-Dissolved (mg/L)	0.00158	0.00084	0.0108		0.00144
	Iron (Fe)-Dissolved (mg/L)	0.035	0.027	<0.010		0.065
	Lead (Pb)-Dissolved (mg/L)	0.000193	<0.000050	<0.000050		<0.000050

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1826315-6	L1826315-7		
		Description	water	water		
		Sampled Date	07-SEP-16	07-SEP-16		
		Sampled Time	13:30	12:25		
		Client ID	WQ-DC-U-R	FIELD BLANK		
Grouping	Analyte					
<b>WATER</b>						
<b>Total Metals</b>	Lithium (Li)-Total (mg/L)	0.0035	<0.0010			
	Magnesium (Mg)-Total (mg/L)	57.0	<0.10			
	Manganese (Mn)-Total (mg/L)	0.889	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.000025 <sup>DLM</sup>	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	0.000449	<0.000050			
	Nickel (Ni)-Total (mg/L)	0.00330	<0.00050			
	Phosphorus (P)-Total (mg/L)	0.078	<0.050			
	Potassium (K)-Total (mg/L)	3.25	<0.10			
	Selenium (Se)-Total (mg/L)	0.000209	<0.000050			
	Silicon (Si)-Total (mg/L)	9.51	<0.050			
	Silver (Ag)-Total (mg/L)	0.000083	<0.000010			
	Sodium (Na)-Total (mg/L)	8.81	<0.050			
	Strontium (Sr)-Total (mg/L)	0.445	<0.00020			
	Sulfur (S)-Total (mg/L)	147	<0.50			
	Thallium (Tl)-Total (mg/L)	0.000037	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	0.0953	<0.00030			
	Uranium (U)-Total (mg/L)	0.00188	<0.000010			
	Vanadium (V)-Total (mg/L)	0.00928	<0.00050			
	Zinc (Zn)-Total (mg/L)	0.0326	<0.0030			
	Zirconium (Zr)-Total (mg/L)	0.00042	<0.00030			
<b>Dissolved Metals</b>	Dissolved Mercury Filtration Location	FIELD	FIELD			
	Dissolved Metals Filtration Location	FIELD	FIELD			
	Aluminum (Al)-Dissolved (mg/L)	0.0431	<0.0010			
	Antimony (Sb)-Dissolved (mg/L)	0.00154	<0.00010			
	Arsenic (As)-Dissolved (mg/L)	0.00931	<0.00010			
	Barium (Ba)-Dissolved (mg/L)	0.0502	<0.000050			
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020			
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050			
	Boron (B)-Dissolved (mg/L)	0.015	<0.010			
	Cadmium (Cd)-Dissolved (mg/L)	0.0000105	<0.0000050			
	Calcium (Ca)-Dissolved (mg/L)	147	<0.050			
	Chromium (Cr)-Dissolved (mg/L)	0.00016	<0.00010			
	Cobalt (Co)-Dissolved (mg/L)	0.00088	<0.00010			
	Copper (Cu)-Dissolved (mg/L)	0.00105	<0.00020			
	Iron (Fe)-Dissolved (mg/L)	0.491	<0.010			
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050			

\* 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		L1826315-1 water 07-SEP-16 12:00 WQ-PC-D	L1826315-2 water 07-SEP-16 16:40 WQ-CH-P-13-01	L1826315-3 water 07-SEP-16 08:40 WQ-NW-SEEP-02	L1826315-4 water TRAVEL BLANK	L1826315-5 water 07-SEP-16 15:50 WQ-VC-UMN(R)
Grouping	Analyte					
<b>WATER</b>						
<b>Dissolved Metals</b>	Lithium (Li)-Dissolved (mg/L)	0.0022	0.0016	0.0017		<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	16.7	93.8	15.9		8.63
	Manganese (Mn)-Dissolved (mg/L)	1.31	0.203	0.00027		0.0523
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000711	<0.000050	<0.00025 <sup>RRR</sup>		0.000394
	Nickel (Ni)-Dissolved (mg/L)	0.00084	0.00760	<0.00050		<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)	1.68	0.45	1.76		0.66
	Selenium (Se)-Dissolved (mg/L)	0.000089	<0.000050	<0.000050		0.000056
	Silicon (Si)-Dissolved (mg/L)	5.90	9.46	2.79		6.24
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010		<0.000010
	Sodium (Na)-Dissolved (mg/L)	6.15	6.02	1.09		2.84
	Strontium (Sr)-Dissolved (mg/L)	0.343	0.548	0.167		0.252
	Sulfur (S)-Dissolved (mg/L)	70.5	323	70.4		11.0
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000012		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00051	<0.00030	<0.00030		<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000555	0.000010	0.000192		0.000464
	Vanadium (V)-Dissolved (mg/L)	0.00063	<0.00050	<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0117	3.75	0.0136		0.0016
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030		<0.00030

\* 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	L1826315-6 water 07-SEP-16 13:30 WQ-DC-U-R	L1826315-7 water 07-SEP-16 12:25 FIELD BLANK		
Grouping	Analyte				
<b>WATER</b>					
<b>Dissolved Metals</b>	Lithium (Li)-Dissolved (mg/L)	0.0023	<0.0010		
	Magnesium (Mg)-Dissolved (mg/L)	60.7	<0.10		
	Manganese (Mn)-Dissolved (mg/L)	0.839	<0.00010		
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)	0.000323	<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	0.00090	<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050		
	Potassium (K)-Dissolved (mg/L)	2.91	<0.10		
	Selenium (Se)-Dissolved (mg/L)	0.000087	<0.000050		
	Silicon (Si)-Dissolved (mg/L)	6.47	<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	9.02	<0.050		
	Strontium (Sr)-Dissolved (mg/L)	0.437	<0.00020		
	Sulfur (S)-Dissolved (mg/L)	149	<0.50		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	0.00052	<0.00030		
	Uranium (U)-Dissolved (mg/L)	0.00162	<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050		
	Zinc (Zn)-Dissolved (mg/L)	0.0044	<0.0010		
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030		

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

## Reference Information

### Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1826315-3	WQ-NW-SEEP-02	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
		WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

### QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Chromium (Cr)-Total	MB-LOR	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1826315-3
Matrix Spike	Boron (B)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1826315-3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-1, -2, -5, -6, -7
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1826315-3
Matrix Spike	Barium (Ba)-Total	MS-B	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Boron (B)-Total	MS-B	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Lithium (Li)-Total	MS-B	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Total	MS-B	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Strontium (Sr)-Total	MS-B	L1826315-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Nitrate (as N)	MS-B	L1826315-1, -4, -6, -7

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis
SP	Sample was Preserved at the laboratory

### Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
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.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

## Reference Information

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**BE-T-L-CCMS-VA** Water Total Be (Low) in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**BR-L-IC-N-VA** Water Bromide in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**CL-IC-N-VA** Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**CL-IC-N-WR** Water Chloride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**CN-CNO-WT** Water Cyanate APHA 4500-CN-L

This analysis is carried out using procedures adapted from APHA method 4500-CN "Cyanide". Cyanate is determined by the Cyanate hydrolysis method using an ammonia selective electrode

**CN-SCN-VA** Water Thiocyanate by Colour APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

**CN-T-CFA-VA** Water Total Cyanide in water by CFA ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

**CN-WAD-CFA-VA** Water Weak Acid Diss. Cyanide in water by CFA APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

**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.

**F-IC-N-VA** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**F-IC-N-WR** Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**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<sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

**HG-D-CVAA-VA** Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**HG-T-CVAA-VA** Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

**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:

$$\text{Ion Balance (\%)} = \frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$$

## Reference Information

**MET-D-CCMS-VA** Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-DIS-LOW-ICP-VA** Water Dissolved Metals in Water by ICPOES EPA 3005A/6010B

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 procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

**MET-T-CCMS-VA** Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**MET-TOT-LOW-ICP-VA** Water Total Metals in Water by ICPOES EPA 3005A/6010B

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 (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

**NH3-F-VA** Water Ammonia in Water by Fluorescence APHA 4500 NH3-NITROGEN (AMMONIA)

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.

**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.

**NO2-L-IC-N-VA** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO2-L-IC-N-WR** Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-VA** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-WR** Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**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.

**S-DIS-ICP-VA** Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

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 - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

## Reference Information

**S-TOT-ICP-VA**                      Water                      Total Sulfur in Water by ICPOES                      EPA SW-846 3005A/6010B

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 - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

**SO4-IC-N-VA**                      Water                      Sulfate in Water by IC                      EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**SO4-IC-N-WR**                      Water                      Sulfate in Water by IC                      EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**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". The Total Dissolved Solids result is calculated from measured concentrations of anions and cations in the sample.

**TSS-VA**                      Water                      Total Suspended Solids by Gravimetric                      APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

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\*\* 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:*

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

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### 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

Canada Toll Free: 1 800 668 9878



L1826315-COFC

COC Number: 14 -

Page \_\_\_ of \_\_\_

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<b>Report To</b>	<b>Report Format / Distribution</b>	<i>(Rush Turnaround Time (TAT) is not available for all tests)</i>	
Company: EDI	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days)	
Contact: Lyndsay Doetzel	Quality Control (QC) Report with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT	
Address: 2195 - 2nd Avenue Whitehorse, YT Y1A 3T8	<input type="checkbox"/> Criteria on Report - provide details below if box checked	E <input type="checkbox"/> Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT	
Phone: 867-393-4882	Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge	
	Email 1 or Fax: <u>lidoetzel@edynamics.com</u>	Specify Date Required for E2, E or P:	
	Email 2: <u>Emilie.Hamm@gov.yk.ca</u>		
	Email 3: <u>erik.pit@gov.yk.ca</u>		

<b>Invoice To</b>	<b>Invoice Distribution</b>	<b>Analysis Request</b>																		
Same as Report To <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																		
Copy of Invoice with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																				
Company: EDI	Email 1 or Fax: <u>sienner@edynamics.com</u>																			
Contact: S Jenner	Email 2: <u>lidoetzel@edynamics.com</u>																			

ALS Lab Work Order # (lab use only)	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-PCT-VA	ANIONS-ALL-IC-WR	CN-WAD-CFA-VA	CN-CNO-WT	CN-SCN-VA	NH3-F-VA	MET-T-BCMDG-VA	MET-D-BCMDG-VA	IONBALANC-VA	TDS-CALC-VA	Number of Containers
	1	WQ-PC-D	07-Sep-16	12:00	Water	R	R	R	R	R	R	R	R	R	R	9
	2	WQ-CH-P-13-01	07-Sep-16	16:40	Water	R	R	R	R	R	R	R	R	R	R	9
	3	WQ-NW-SEEP-02	08-Sep-16	08:40	Water	R	R	R	R	R	R	R	R	R	R	2
	4	TRAVEL-BLANK	07-Sep-16	12:25	Water	R	R	R	R	R	R	R	R	R	R	7
	5	WQ-VC-UHN (r)	06-Sep-16	15:50	Water	R	R	R	R	R	R	R	R	R	R	9
	6	WQ-DC-U-r	07-Sep-16	13:30	Water	R	R	R	R	R	R	R	R	R	R	9
	7	FIELD BLANK	07-Sep-16	12:25	Water	R	R	R	R	R	R	R	R	R	R	9

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>	<b>Special Instructions / Specify Criteria to add on report (client Use)</b>	<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>	
Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are samples for human drinking water use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Ice packs Yes <input type="checkbox"/> No <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
SHIPPING RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)	
Released by: <u>[Signature]</u>	Date: <u>08 Sept. 2016</u> Time: <u>08:50</u>	Received by: <u>[Signature]</u>	Date: <u>08 Sept. 2016</u> Time: <u>08:50</u>
FINAL SHIPMENT RECEPTION (lab use only)		Received by: <u>[Signature]</u> Date: <u>08 Sept. 2016</u> Time: <u>08:50</u>	