



# CERTIFICATE OF ANALYSIS

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**Date:** September 27, 2005  
**ALS File No.** W4412  
**Report On:** 40692 Water Analysis  
**Report To:** **Gartner Lee Ltd.**  
2251 2nd Ave  
Whitehorse, YT  
Y1A 5W1  
**Attention:** **Mr. Martin Guilbeault**  
**Received:** September 13, 2005

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**ALS ENVIRONMENTAL**

per:

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File No. W4412

**REMARKS**



The detection limits for some of the metals have been increased for several of the samples reported in the following data tables due to sample matrix interferences.

**RESULTS OF ANALYSIS - Water**



Sample ID	BH1	BH2	BH4	P01-07C -DD27m	P01-07C
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	10:52	11:15	11:30	14:00	14:30
ALS ID	1	2	3	4	5

**Physical Tests**

Conductivity	(uS/cm)	509	506	474	1530	1480
Hardness	CaCO3	292	269	295	822	923
pH		6.99	6.79	7.11	7.35	7.45

**Dissolved Anions**

Alkalinity-Total		CaCO3	164	100	125	230	218
Sulphate	SO4		110	159	121	647	641

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**RESULTS OF ANALYSIS - Water**

Sample ID	BH1	BH2	BH4	P01-07C -DD27m	P01-07C
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	10:52	11:15	11:30	14:00	14:30
ALS ID	1	2	3	4	5

**Dissolved Metals**

Aluminum	D-Al	0.090	0.224	0.085	<0.10	<0.10
Antimony	D-Sb	<0.00050	<0.0025	<0.00050	<0.0050	<0.0050
Arsenic	D-As	<0.0010	<0.0050	<0.0010	<0.010	0.014
Barium	D-Ba	0.038	0.052	0.028	0.142	0.144
Beryllium	D-Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Boron	D-B	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	D-Cd	0.00360	0.0271	0.00356	<0.00050	<0.00050
Calcium	D-Ca	85.6	70.0	85.9	249	284
Chromium	D-Cr	<0.00050	<0.0025	<0.00050	<0.0050	<0.0050
Cobalt	D-Co	0.00098	<0.0025	0.00887	<0.0050	0.0112
Copper	D-Cu	0.0041	<0.0050	0.0052	<0.010	<0.010
Iron	D-Fe	<0.030	0.070	<0.030	18.7	23.6
Lead	D-Pb	0.0024	<0.0050	<0.0010	<0.010	<0.010
Lithium	D-Li	<0.050	<0.050	<0.050	<0.050	<0.050
Magnesium	D-Mg	19.0	22.9	19.7	48.4	51.7
Manganese	D-Mn	0.360	0.021	0.149	30.8	38.6
Mercury	D-Hg	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum	D-Mo	<0.0010	<0.0050	<0.0010	<0.010	<0.010
Nickel	D-Ni	0.0069	0.069	0.0186	<0.050	<0.050
Selenium	D-Se	<0.0010	<0.0050	<0.0010	<0.010	<0.010
Silver	D-Ag	<0.000050	<0.00025	<0.000050	<0.00050	<0.00050
Sodium	D-Na	6.4	5.6	6.3	84.6	51.9
Thallium	D-Tl	<0.00020	<0.0010	<0.00020	<0.0020	<0.0020
Titanium	D-Ti	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium	D-U	0.00162	<0.0010	<0.00020	0.0068	0.0074
Vanadium	D-V	<0.030	<0.030	<0.030	0.061	0.060
Zinc	D-Zn	0.951	17.3	1.91	0.0098	0.0090

Remarks regarding the analyses appear at the beginning of this report.  
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**RESULTS OF ANALYSIS - Water**



Sample ID	P01-05A -DD10m	P01-05A	P01-07D -DD34m	P01-07D	P01-05B
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	17:39	17:20	14:25	15:30	17:36
ALS ID	6	7	8	9	10

**Physical Tests**

Conductivity	(uS/cm)	1270	1240	1830	1860	1810
Hardness	CaCO3	292	294	968	985	935
pH		7.45	7.46	7.10	7.25	7.30

**Dissolved Anions**

Alkalinity-Total		CaCO3	24.1	30.1	146	147	237
Sulphate	SO4		538	528	950	961	813

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**RESULTS OF ANALYSIS - Water**

Sample ID	P01-05A -DD10m	P01-05A	P01-07D -DD34m	P01-07D	P01-05B
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	17:39	17:20	14:25	15:30	17:36
ALS ID	6	7	8	9	10

**Dissolved Metals**

Aluminum	D-Al	<0.020	<0.020	<0.20	<0.10	<0.050
Antimony	D-Sb	0.0019	0.0351	<0.010	<0.0050	0.0163
Arsenic	D-As	<0.0020	0.0045	<0.020	<0.010	0.0226
Barium	D-Ba	<0.020	<0.020	0.068	0.070	0.028
Beryllium	D-Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Boron	D-B	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	D-Cd	<0.00010	<0.00010	<0.0010	<0.00050	<0.00025
Calcium	D-Ca	87.9	84.5	283	290	292
Chromium	D-Cr	<0.0010	<0.0010	<0.010	<0.0050	<0.0025
Cobalt	D-Co	0.0019	0.0020	0.042	0.0472	0.0083
Copper	D-Cu	<0.0040	<0.0020	<0.020	<0.010	<0.0050
Iron	D-Fe	0.137	0.057	16.1	17.4	4.98
Lead	D-Pb	<0.0020	0.0290	<0.020	<0.010	0.0348
Lithium	D-Li	<0.050	<0.050	<0.050	<0.050	<0.050
Magnesium	D-Mg	17.7	20.1	63.6	63.5	49.9
Manganese	D-Mn	0.188	0.302	45.6	47.4	17.3
Mercury	D-Hg	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum	D-Mo	0.0116	0.0096	<0.020	<0.010	<0.0050
Nickel	D-Ni	<0.010	<0.010	<0.10	<0.050	<0.025
Selenium	D-Se	<0.0020	<0.0020	<0.020	<0.010	<0.0050
Silver	D-Ag	<0.00010	<0.00010	<0.0010	<0.00050	<0.00025
Sodium	D-Na	183	176	33.5	32.5	59.6
Thallium	D-Tl	<0.00040	<0.00040	<0.0040	<0.0020	<0.0010
Titanium	D-Ti	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium	D-U	<0.00040	<0.00040	0.0054	0.0047	0.0058
Vanadium	D-V	<0.030	<0.030	<0.070	<0.090	0.033
Zinc	D-Zn	0.0108	0.0262	0.0148	0.0149	0.0718

Remarks regarding the analyses appear at the beginning of this report.  
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**RESULTS OF ANALYSIS - Water**



Sample ID	P01-05B -DD16m	X21A	X21B	X21C	BH12A
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	17:00	17:00	17:00	17:00	14:30
ALS ID	11	12	13	14	15

**Physical Tests**

Conductivity	(uS/cm)	1770	11700	1800	358	919
Hardness	CaCO3	914	4830	849	196	520
pH		7.43	4.42	6.69	8.20	7.82

**Dissolved Anions**

Alkalinity-Total		CaCO3	242	54.3	75.1	190	183
Sulphate	SO4		783	11900	931	8.4	298

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**RESULTS OF ANALYSIS - Water**

Sample ID	P01-05B -DD16m	X21A	X21B	X21C	BH12A
Sample Date	05-09-11	05-09-11	05-09-11	05-09-11	05-09-11
Sample Time	17:00	17:00	17:00	17:00	14:30
ALS ID	11	12	13	14	15

**Dissolved Metals**

Aluminum	D-Al	<0.050	<0.50	0.077	<0.020	<0.020
Antimony	D-Sb	0.0045	<0.025	<0.0025	<0.0010	<0.0010
Arsenic	D-As	0.0124	<0.050	<0.0050	0.0226	<0.0020
Barium	D-Ba	0.035	<0.10	0.030	0.176	0.033
Beryllium	D-Be	<0.0050	<0.025	<0.0050	<0.0050	<0.0050
Boron	D-B	<0.10	<0.50	<0.10	<0.10	<0.10
Cadmium	D-Cd	<0.00025	<0.0025	<0.00025	<0.00010	0.00023
Calcium	D-Ca	281	367	253	62.3	111
Chromium	D-Cr	<0.0025	<0.025	<0.0025	<0.0010	<0.0010
Cobalt	D-Co	0.0082	<0.025	0.0342	<0.0010	<0.0010
Copper	D-Cu	<0.0050	<0.050	<0.0050	<0.0020	0.0022
Iron	D-Fe	7.10	3390	165	0.260	<0.030
Lead	D-Pb	<0.0050	<0.050	<0.0050	<0.0020	<0.0020
Lithium	D-Li	<0.050	<0.25	<0.050	<0.050	<0.050
Magnesium	D-Mg	51.5	950	52.6	9.77	58.8
Manganese	D-Mn	17.7	324	20.9	0.248	<0.010
Mercury	D-Hg	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum	D-Mo	<0.0050	<0.050	<0.0050	0.0037	<0.0020
Nickel	D-Ni	<0.025	<0.25	0.026	<0.010	<0.010
Selenium	D-Se	<0.0050	<0.050	<0.0050	<0.0020	<0.0020
Silver	D-Ag	<0.00025	<0.0025	<0.00025	<0.00010	<0.00010
Sodium	D-Na	71.0	20	60.1	2.4	5.0
Thallium	D-Tl	<0.0010	<0.010	<0.0010	<0.00040	<0.00040
Titanium	D-Ti	<0.050	<0.25	<0.050	<0.050	<0.050
Uranium	D-U	0.0061	<0.010	0.0037	<0.00040	0.00532
Vanadium	D-V	<0.030	<2.5	<0.15	<0.030	<0.030
Zinc	D-Zn	0.0465	104	4.12	0.0058	0.201

Remarks regarding the analyses appear at the beginning of this report.  
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File No. W4412  
**RESULTS OF ANALYSIS - Water**



Sample ID	BH12B	BH13A
Sample Date	05-09-11	05-09-11
Sample Time	14:30	13:50
ALS ID	16	17

**Physical Tests**

Conductivity	(uS/cm)	938	756
Hardness	CaCO3	475	362
pH		7.73	7.98

**Dissolved Anions**

Alkalinity-Total		CaCO3	180	188
Sulphate	SO4		315	234

Remarks regarding the analyses appear at the beginning of this report.  
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**RESULTS OF ANALYSIS - Water**

Sample ID	BH12B	BH13A
Sample Date	05-09-11	05-09-11
Sample Time	14:30	13:50
ALS ID	16	17

**Dissolved Metals**

Aluminum	D-Al	<0.020	<0.020
Antimony	D-Sb	<0.0010	<0.0010
Arsenic	D-As	<0.0020	<0.0020
Barium	D-Ba	0.031	0.039
Beryllium	D-Be	<0.0050	<0.0050
Boron	D-B	<0.10	<0.10
Cadmium	D-Cd	0.00023	<0.00010
Calcium	D-Ca	105	100
Chromium	D-Cr	<0.0010	<0.0010
Cobalt	D-Co	<0.0010	0.0012
Copper	D-Cu	0.0023	<0.0020
Iron	D-Fe	<0.030	2.24
Lead	D-Pb	<0.0020	<0.0020
Lithium	D-Li	<0.050	<0.050
Magnesium	D-Mg	52.0	27.2
Manganese	D-Mn	<0.010	0.430
Mercury	D-Hg	<0.00020	<0.00020
Molybdenum	D-Mo	<0.0020	0.0054
Nickel	D-Ni	<0.010	<0.010
Selenium	D-Se	<0.0020	<0.0020
Silver	D-Ag	<0.00010	<0.00010
Sodium	D-Na	4.4	37.2
Thallium	D-Tl	<0.00040	<0.00040
Titanium	D-Ti	<0.050	<0.050
Uranium	D-U	0.00515	0.00136
Vanadium	D-V	<0.030	<0.030
Zinc	D-Zn	0.167	0.0191

Remarks regarding the analyses appear at the beginning of this report.  
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**Appendix 1 - QUALITY CONTROL - Replicates**



Water		P01-07D -DD34m	P01-07D -DD34m	X21A	X21A	
		05-09-11 14:25	QC # 463801	05-09-11 17:00	QC # 463802	
<b>Physical Tests</b>						
Conductivity	(uS/cm)	1830	1830	11700	11600	
Hardness	CaCO3	968	899	4830	4930	
pH		7.10	7.11	4.42	4.08	
<b>Dissolved Anions</b>						
Alkalinity-Total		CaCO3	146	150	54.3	52.6
Sulphate	SO4		950	956	11900	12000

Remarks regarding the analyses appear at the beginning of this report.  
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## Appendix 1 - QUALITY CONTROL - Replicates



Water	P01-07D -DD34m	P01-07D -DD34m	X21A	X21A
	05-09-11 14:25	QC # 463801	05-09-11 17:00	QC # 463802

**Dissolved Metals**

Aluminum	D-Al	<0.20	<0.20	<0.50	<0.50
Antimony	D-Sb	<0.010	<0.010	<0.025	<0.025
Arsenic	D-As	<0.020	<0.020	<0.050	<0.050
Barium	D-Ba	0.068	0.065	<0.10	<0.10
Beryllium	D-Be	<0.0050	<0.0050	<0.025	<0.025
Boron	D-B	<0.10	<0.10	<0.50	<0.50
Cadmium	D-Cd	<0.0010	<0.0010	<0.0025	<0.0025
Calcium	D-Ca	283	263	367	379
Chromium	D-Cr	<0.010	<0.010	<0.025	<0.025
Cobalt	D-Co	0.042	0.041	<0.025	<0.025
Copper	D-Cu	<0.020	<0.020	<0.050	<0.050
Iron	D-Fe	16.1	14.9	3390	3590
Lead	D-Pb	<0.020	<0.020	<0.050	<0.050
Lithium	D-Li	<0.050	<0.050	<0.25	<0.25
Magnesium	D-Mg	63.6	59.1	950	968
Manganese	D-Mn	45.6	43.4	324	343
Mercury	D-Hg	<0.00020	<0.00020	<0.00020	<0.00020
Molybdenum	D-Mo	<0.020	<0.020	<0.050	<0.050
Nickel	D-Ni	<0.10	<0.10	<0.25	<0.25
Selenium	D-Se	<0.020	<0.020	<0.050	<0.050
Silver	D-Ag	<0.0010	<0.0010	<0.0025	<0.0025
Sodium	D-Na	33.5	31.9	20	22
Thallium	D-Tl	<0.0040	<0.0040	<0.010	<0.010
Titanium	D-Ti	<0.050	<0.050	<0.25	<0.25
Uranium	D-U	0.0054	0.0054	<0.010	<0.010
Vanadium	D-V	<0.070	<0.070	<2.5	<2.5
Zinc	D-Zn	0.0148	0.0142	104	107

Remarks regarding the analyses appear at the beginning of this report.  
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## Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

### Conductivity in Water

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

Recommended Holding Time:

Sample: 28 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

### pH in Water

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.

Recommended Holding Time:

Sample: 2 hours

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

### Alkalinity in Water by Colourimetry

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

Recommended Holding Time:

Sample: 14 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

### Sulphate in Water

This analysis is carried out using procedures adapted from APHA Method 4500-SO4 "Sulphate". Sulphate is determined using the turbidimetric method.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver



**Metals in Water**

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 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 hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Recommended Holding Time:  
Sample: 6 months  
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

**Mercury in Water**

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 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 a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

Recommended Holding Time:  
Sample: 28 days  
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

**Results contained within this certificate relate only to the samples as submitted.**

**This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.**

**End of Report**