



1020 Cordova St. East Vancouver BC V6A 4A3 Canada
Phone (604) 253-3158 Fax (604) 253-1716

Acme Analytical Laboratories (Vancouver) Ltd.

www.acmelab.com

Client: Metropolitan State College of Denver
Dept of Earth & Atmospheric Sciences
Campus Box 22, P.O. Box 173362
Denver CO 80217-3362 USA

Submitted By: Uwe Richard Kackstaetter
Receiving Lab: Canada-Vancouver
Received: October 20, 2009
Report Date: October 28, 2009
Page: 1 of 2

CERTIFICATE OF ANALYSIS

VAN09005079.1

CLIENT JOB INFORMATION

Project: Fall 2009 Semester
Shipment ID:
P.O. Number: 102436
Number of Samples: 10

SAMPLE DISPOSAL

DISP-PLP Dispose of Pulp After 90 days

Acme does not accept responsibility for samples left at the laboratory after 90 days without prior written instructions for sample storage or return.

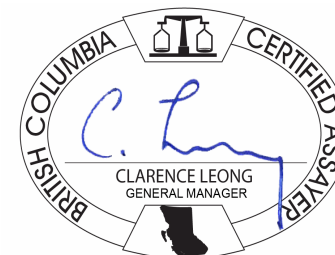
Invoice To: Metropolitan State College of Denver
Dept of Earth & Atmospheric Sciences
Campus Box 22, P.O. Box 173362
Denver CO 80217-3362
USA

CC:

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Method Code	Number of Samples	Code Description	Test Wgt (g)	Report Status	Lab
No Prep	10	Sorting of samples on arrival and labeling			VAN
Split Solution	10	Analysis sample split/packet			VAN
2CB	10	Water analysis by ICP-MS	1	Completed	VAN

ADDITIONAL COMMENTS



This report supersedes all previous preliminary and final reports with this file number dated prior to the date on this certificate. Signature indicates final approval; preliminary reports are unsigned and should be used for reference only.
All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of analysis only.
** asterisk indicates that an analytical result could not be provided due to unusually high levels of interference from other elements.



Acme Analytical Laboratories (Vancouver) Ltd.
 1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: **Metropolitan State College of Denver**
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester
 Report Date: October 28, 2009

Page: 2 of 2 Part 1

CERTIFICATE OF ANALYSIS

VAN09005079.1

Method	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	
Analyte	Dilution	Ag	Al	As	Au	B	Ba	Be	Bi	Br	Ca	Cd	Ce	Cl	Co	Cr	Cs	Cu	Dy	Er	
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	
MDL	1	0.05	1	0.5	0.05	5	0.05	0.05	0.05	5	50	0.05	0.01	1	0.02	0.5	0.01	0.1	0.01	0.01	
F09GW001-UC	Water	1	<0.05	26	<0.5	<0.05	46	4.86	0.83	<0.05	51	43579	<0.05	0.03	13	<0.02	<0.5	0.16	20.3	<0.01	<0.01
F09GW001-CS	Water	1	0.06	45	<0.5	<0.05	176	3.40	2.33	0.15	167	79098	<0.05	0.04	31	0.38	<0.5	0.59	26.6	0.02	0.01
F09GW001-TS	Water	1	0.25	66	<0.5	<0.05	42	0.86	0.29	<0.05	39	32109	<0.05	0.06	7	<0.02	<0.5	0.19	11.0	<0.01	<0.01
F09GW001-7M	Water	1	<0.05	9	<0.5	<0.05	57	5.47	0.18	<0.05	86	31466	<0.05	0.02	19	0.09	<0.5	0.06	8.1	0.09	0.03
F09GW001-IS	Water	1	<0.05	119	8.9	<0.05	224	4.30	5.94	<0.05	159	33449	<0.05	0.02	27	0.18	<0.5	0.95	5.6	0.03	0.05
F09GW001-NV	Water	1	<0.05	45	<0.5	<0.05	113	1.90	1.22	<0.05	94	46564	<0.05	0.03	17	0.21	<0.5	0.47	13.7	<0.01	<0.01
F09GW002-NJ	Water	1	<0.05	53	<0.5	0.07	162	6.69	1.90	<0.05	161	80158	<0.05	0.04	29	0.34	<0.5	0.73	20.7	<0.01	<0.01
F09GW002-WS	Water	1	<0.05	36	<0.5	<0.05	108	3.72	1.41	<0.05	96	46204	<0.05	0.01	18	0.30	<0.5	0.34	19.2	<0.01	<0.01
F09GW002-ST	Water	1	<0.05	119	<0.5	<0.05	246	3.67	2.25	<0.05	147	79155	<0.05	0.01	29	<0.02	1.5	0.53	11.2	0.02	0.01
F09GW002-SH	Water	1	<0.05	43	<0.5	<0.05	123	6.38	1.78	<0.05	104	49164	<0.05	0.11	19	0.62	0.5	0.40	13.5	<0.01	<0.01



Acme Analytical Laboratories (Vancouver) Ltd.
 1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: Metropolitan State College of Denver
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester
Report Date: October 28, 2009

Page: 2 of 2 Part 2

CERTIFICATE OF ANALYSIS

VAN09005079.1

Method	Analyte	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
		Eu	Fe	Ga	Gd	Ge	Hf	Hg	Ho	In	K	La	Li	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni
		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
		MDL	10	0.05	0.01	0.05	0.02	0.1	0.01	0.01	0.01	50	0.01	0.1	0.01	50	0.05	0.1	50	0.01	0.01
F09GW001-UC	Water	<0.01	<10	<0.05	<0.01	0.07	<0.02	<0.1	<0.01	<0.01	2694	0.02	28.7	<0.01	7817	2.17	<0.1	18636	<0.01	0.03	<0.2
F09GW001-CS	Water	<0.01	<10	<0.05	0.04	0.49	<0.02	<0.1	<0.01	<0.01	10316	0.02	107.1	<0.01	14714	255.9	0.1	79342	<0.01	0.04	1.2
F09GW001-TS	Water	<0.01	<10	<0.05	<0.01	0.08	<0.02	<0.1	<0.01	<0.01	1960	0.03	21.5	<0.01	10547	0.17	<0.1	16057	<0.01	0.04	<0.2
F09GW001-7M	Water	0.02	<10	<0.05	0.14	<0.05	<0.02	<0.1	0.01	<0.01	2020	0.03	38.0	<0.01	8114	50.43	<0.1	24763	<0.01	0.17	2.0
F09GW001-IS	Water	<0.01	1564	<0.05	<0.01	0.77	<0.02	0.2	0.01	<0.01	12633	<0.01	124.7	0.01	5514	140.8	0.5	94492	<0.01	<0.01	<0.2
F09GW001-NV	Water	<0.01	<10	<0.05	<0.01	0.30	<0.02	<0.1	<0.01	<0.01	5787	0.01	63.6	<0.01	8830	90.82	<0.1	43354	<0.01	0.02	0.4
F09GW002-NJ	Water	<0.01	<10	<0.05	0.01	0.54	<0.02	<0.1	<0.01	<0.01	9424	0.03	103.1	<0.01	14749	165.1	0.2	76862	<0.01	0.03	0.5
F09GW002-WS	Water	<0.01	<10	<0.05	0.02	0.27	<0.02	<0.1	<0.01	<0.01	5897	<0.01	64.6	<0.01	9307	148.4	<0.1	46507	<0.01	<0.01	0.7
F09GW002-ST	Water	<0.01	<10	<0.05	0.03	0.37	<0.02	<0.1	<0.01	<0.01	9278	<0.01	106.7	<0.01	16676	66.41	0.3	70244	<0.01	0.03	1.4
F09GW002-SH	Water	<0.01	<10	<0.05	0.01	0.35	<0.02	<0.1	<0.01	<0.01	6500	0.08	72.8	<0.01	8872	302.8	0.2	50728	<0.01	0.04	0.6



Acme Analytical Laboratories (Vancouver) Ltd.
 1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: Metropolitan State College of Denver
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester
Report Date: October 28, 2009

Page: 2 of 2 Part 3

CERTIFICATE OF ANALYSIS

VAN09005079.1

Method	Analyte	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
		P	Pb	Pd	Pr	Pt	Rb	Re	Rh	Ru	S	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Te
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MDL		20	0.1	0.2	0.01	0.01	0.01	0.01	0.01	0.05	1	0.05	1	0.5	40	0.02	0.05	0.01	0.02	0.01	0.05
F09GW001-UC	Water	<20	0.2	<0.2	<0.01	<0.01	7.55	<0.01	<0.01	<0.05	4	<0.05	<1	<0.5	1461	<0.02	<0.05	64.58	<0.02	<0.01	<0.05
F09GW001-CS	Water	<20	0.4	<0.2	<0.01	0.06	35.53	<0.01	<0.01	<0.05	10	0.08	<1	0.5	3570	0.02	0.11	149.8	<0.02	<0.01	<0.05
F09GW001-TS	Water	<20	0.2	<0.2	<0.01	<0.01	7.80	<0.01	<0.01	<0.05	3	<0.05	<1	<0.5	824	<0.02	<0.05	44.96	<0.02	<0.01	<0.05
F09GW001-7M	Water	<20	0.1	<0.2	0.02	<0.01	5.94	<0.01	<0.01	<0.05	6	<0.05	<1	<0.5	814	0.08	<0.05	84.81	<0.02	0.02	<0.05
F09GW001-IS	Water	<20	0.1	<0.2	<0.01	<0.01	40.15	<0.01	<0.01	<0.05	11	<0.05	2	<0.5	6421	<0.02	0.06	195.0	<0.02	<0.01	<0.05
F09GW001-NV	Water	<20	0.3	<0.2	<0.01	<0.01	19.03	<0.01	<0.01	<0.05	5	<0.05	<1	<0.5	1797	<0.02	<0.05	81.50	<0.02	<0.01	<0.05
F09GW002-NJ	Water	<20	0.4	<0.2	<0.01	<0.01	33.27	<0.01	<0.01	<0.05	12	<0.05	<1	0.6	3346	<0.02	<0.05	140.8	<0.02	<0.01	<0.05
F09GW002-WS	Water	<20	0.3	<0.2	<0.01	<0.01	18.90	<0.01	<0.01	<0.05	5	<0.05	<1	<0.5	1816	<0.02	<0.05	84.75	<0.02	<0.01	<0.05
F09GW002-ST	Water	<20	0.2	<0.2	<0.01	<0.01	28.56	<0.01	<0.01	<0.05	10	<0.05	<1	0.6	3141	<0.02	<0.05	154.8	<0.02	<0.01	<0.05
F09GW002-SH	Water	<20	0.4	<0.2	0.01	<0.01	23.27	<0.01	<0.01	<0.05	6	<0.05	<1	<0.5	2232	<0.02	<0.05	87.42	<0.02	<0.01	<0.05



Acme Analytical Laboratories (Vancouver) Ltd.
 1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: Metropolitan State College of Denver
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester
Report Date: October 28, 2009

Page: 2 of 2 Part 4

CERTIFICATE OF ANALYSIS

VAN09005079.1

Method	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	
Analyte	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr	
Unit	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	
MDL	0.05	10	0.01	0.01	0.02	0.2	0.02	0.01	0.01	0.5	0.02	
F09GW001-UC	Water	<0.05	<10	<0.01	<0.01	0.69	<0.2	<0.02	0.07	<0.01	9.7	0.14
F09GW001-CS	Water	<0.05	<10	<0.01	<0.01	1.27	0.4	<0.02	0.17	<0.01	22.3	0.69
F09GW001-TS	Water	<0.05	<10	<0.01	<0.01	0.43	<0.2	<0.02	0.04	<0.01	12.1	0.06
F09GW001-7M	Water	<0.05	<10	0.01	<0.01	1.79	0.7	<0.02	0.65	0.03	7.6	0.04
F09GW001-IS	Water	0.06	<10	<0.01	<0.01	2.44	<0.2	<0.02	0.41	0.06	17.0	0.23
F09GW001-NV	Water	<0.05	<10	<0.01	<0.01	0.56	<0.2	<0.02	0.06	<0.01	15.0	0.27
F09GW002-NJ	Water	<0.05	<10	<0.01	<0.01	0.98	<0.2	<0.02	0.08	<0.01	19.9	0.15
F09GW002-WS	Water	<0.05	<10	<0.01	<0.01	0.68	<0.2	<0.02	0.08	<0.01	12.1	0.26
F09GW002-ST	Water	<0.05	<10	<0.01	<0.01	1.63	<0.2	<0.02	0.20	<0.01	18.9	0.67
F09GW002-SH	Water	<0.05	<10	0.06	<0.01	0.53	<0.2	<0.02	0.07	<0.01	16.8	0.21



Acme Analytical Laboratories (Vancouver) Ltd.

1020 Cordova St. East Vancouver BC V6A 4A3 Canada

Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: **Metropolitan State College of Denver**

Dept of Earth & Atmospheric Sciences

Campus Box 22, P.O. Box 173362

Denver CO 80217-3362 USA

Project: Fall 2009 Semester

Report Date: October 28, 2009

Page: 1 of 1 Part 1

QUALITY CONTROL REPORT

VAN09005079.1

Method		2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	
Analyte	Dilution	Ag	Al	As	Au	B	Ba	Be	Bi	Br	Ca	Cd	Ce	Cl	Co	Cr	Cs	Cu	Dy	Er	
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	
MDL		1	0.05	1	0.5	0.05	5	0.05	0.05	0.05	5	50	0.05	0.01	1	0.02	0.5	0.01	0.1	0.01	
Pulp Duplicates																					
F09GW002-SH	Water	1	<0.05	43	<0.5	<0.05	123	6.38	1.78	<0.05	104	49164	<0.05	0.11	19	0.62	0.5	0.40	13.5	<0.01	<0.01
REP F09GW002-SH	QC	1	<0.05	40	<0.5	<0.05	113	5.91	1.52	<0.05	97	49024	<0.05	0.09	18	0.54	<0.5	0.37	12.7	<0.01	<0.01
Reference Materials																					
STD WASTEWATRD10	Standard	1	175.9	1946	386.6	<0.05	1011	1702	477.1	<0.05	6	89	81.22	<0.01	<1	712.0	97.1	<0.01	397.8	<0.01	<0.01
BLK	Blank	1	<0.05	<1	<0.5	<0.05	<5	<0.05	<0.05	<0.05	<5	<50	<0.05	<0.01	<1	<0.02	<0.5	<0.01	<0.1	<0.01	<0.01
BLK	Blank	1	<0.05	<1	<0.5	<0.05	<5	<0.05	<0.05	<0.05	<5	<50	<0.05	<0.01	<1	<0.02	<0.5	<0.01	<0.1	<0.01	<0.01



Acme Analytical Laboratories (Vancouver) Ltd.

1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: Metropolitan State College of Denver
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester
Report Date: October 28, 2009

Page: 1 of 1 Part 2

QUALITY CONTROL REPORT

VAN09005079.1

Method		2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
Analyte		Eu	Fe	Ga	Gd	Ge	Hf	Hg	Ho	In	K	La	Li	Lu	Mg	Mn	Mo	Na	Nb	Nd	Ni
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MDL		0.01	10	0.05	0.01	0.05	0.02	0.1	0.01	0.01	50	0.01	0.1	0.01	50	0.05	0.1	50	0.01	0.01	0.2
Pulp Duplicates																					
F09GW002-SH	Water	<0.01	<10	<0.05	0.01	0.35	<0.02	<0.1	<0.01	<0.01	6500	0.08	72.8	<0.01	8872	302.8	0.2	50728	<0.01	0.04	0.6
REP F09GW002-SH	QC	<0.01	<10	<0.05	<0.01	0.30	<0.02	<0.1	<0.01	<0.01	6383	0.06	64.7	<0.01	8474	256.9	0.2	51044	<0.01	0.03	0.5
Reference Materials																					
STD WASTEWATRD10	Standard	<0.01	859	0.09	0.01	1.35	<0.02	<0.1	<0.01	<0.01	<50	<0.01	<0.1	<0.01	<50	701.0	427.9	<50	<0.01	<0.01	2480
BLK	Blank	<0.01	<10	<0.05	<0.01	<0.05	<0.02	<0.1	<0.01	<0.01	<50	<0.01	<0.1	<0.01	<50	<0.05	<0.1	<50	<0.01	<0.01	<0.2
BLK	Blank	<0.01	<10	<0.05	<0.01	<0.05	<0.02	<0.1	<0.01	<0.01	<50	<0.01	<0.1	<0.01	<50	<0.05	<0.1	<50	<0.01	<0.01	<0.2



Acme Analytical Laboratories (Vancouver) Ltd.

1020 Cordova St. East Vancouver BC V6A 4A3 Canada
 Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: Metropolitan State College of Denver
 Dept of Earth & Atmospheric Sciences
 Campus Box 22, P.O. Box 173362
 Denver CO 80217-3362 USA

Project: Fall 2009 Semester

Report Date: October 28, 2009

Page: 1 of 1 Part 3

QUALITY CONTROL REPORT

VAN09005079.1

Method		2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
Analyte		P	Pb	Pd	Pr	Pt	Rb	Re	Rh	Ru	S	Sb	Sc	Se	Si	Sm	Sn	Sr	Ta	Tb	Te
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppm	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MDL		20	0.1	0.2	0.01	0.01	0.01	0.01	0.01	0.01	1	0.05	1	0.5	40	0.02	0.05	0.01	0.02	0.01	0.05
Pulp Duplicates																					
F09GW002-SH	Water	<20	0.4	<0.2	0.01	<0.01	23.27	<0.01	<0.01	<0.05	6	<0.05	<1	<0.5	2232	<0.02	<0.05	87.42	<0.02	<0.01	<0.05
REP F09GW002-SH	QC	<20	0.7	<0.2	<0.01	<0.01	19.99	<0.01	<0.01	<0.05	5	<0.05	<1	<0.5	1897	<0.02	<0.05	76.22	<0.02	<0.01	<0.05
Reference Materials																					
STD WASTEWATRD10	Standard	<20	1261	<0.2	<0.01	<0.01	<0.01	<0.01	0.03	<0.05	<1	255.1	<1	795.1	89	<0.02	<0.05	262.4	<0.02	<0.01	<0.05
BLK	Blank	<20	<0.1	<0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<1	<0.05	<1	<0.5	<40	<0.02	<0.05	<0.01	<0.02	<0.01	<0.05
BLK	Blank	<20	<0.1	<0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<1	<0.05	<1	<0.5	<40	<0.02	<0.05	<0.01	<0.02	<0.01	<0.05



Acme Analytical Laboratories (Vancouver) Ltd.

1020 Cordova St. East Vancouver BC V6A 4A3 Canada

Phone (604) 253-3158 Fax (604) 253-1716

www.acmelab.com

Client: **Metropolitan State College of Denver**

Dept of Earth & Atmospheric Sciences

Campus Box 22, P.O. Box 173362

Denver CO 80217-3362 USA

Project: Fall 2009 Semester

Report Date: October 28, 2009

Page: 1 of 1 Part 4

QUALITY CONTROL REPORT

VAN09005079.1

Method		2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
Analyte		Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn	Zr
Unit		ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
MDL		0.05	10	0.01	0.01	0.02	0.2	0.02	0.01	0.01	0.5	0.02
Pulp Duplicates												
F09GW002-SH	Water	<0.05	<10	0.06	<0.01	0.53	<0.2	<0.02	0.07	<0.01	16.8	0.21
REP F09GW002-SH	QC	<0.05	<10	0.06	<0.01	0.46	<0.2	<0.02	0.06	<0.01	15.1	0.18
Reference Materials												
STD WASTEWATRD10	Standard	<0.05	<10	467.7	<0.01	<0.02	791.3	0.11	<0.01	<0.01	933.5	0.05
BLK	Blank	<0.05	<10	<0.01	<0.01	<0.02	<0.2	<0.02	<0.01	<0.01	<0.5	<0.02
BLK	Blank	<0.05	<10	<0.01	<0.01	<0.02	<0.2	<0.02	<0.01	<0.01	<0.5	<0.02