

Your Project #: VLMP
 Site Location: E220327 GREEN LAKE AT CENTER
 Requisition Form # 50172967
 Client Code # d6
 Your C.O.C. #: 50172967

Attention: Marg Sidney

MINISTRY OF ENVIRONMENT
 FRBC-Thompson Nicola-Recov(d6)
 1259 DALHOUSIE DRIVE
 KAMLOOPS, BC
 Canada V2C 5Z5

Report Date: 2013/05/15

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B334890

Received: 2013/05/03, 08:30

Sample Matrix: Water
 # Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity - Water	2	2013/05/03	2013/05/04	BBY6SOP-00026	SM2320B
Temperature at Arrival	2	N/A	2013/05/03		
Temperature at Arrival	1	N/A	2013/05/14		
Chlorophyll A (water)(sin)	1	2013/05/14	2013/05/14	BBY6SOP-00002	SM-10200 H
Chloride by Automated Colourimetry	2	N/A	2013/05/06	BBY6SOP-00011	SM-4500-CI-
Carbon (DOC)	2	N/A	2013/05/03	BBY6SOP-00003	SM-5310C
Conductance - water	2	N/A	2013/05/04	BBY6SOP-00026	SM-2510B
Hardness Total (calculated as CaCO3)	2	N/A	2013/05/08	BBY7SOP-00002	EPA 6020A
Bromide as Bromine (Br) by ICPMS	2	N/A	2013/05/10	BBY7SOP-00002	EPA 6020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	2	2013/05/03	2013/05/08	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total)	2	2013/05/07	2013/05/08	BBY7SOP-00002	EPA 6020A
Nitrogen (Total)	2	2013/05/07	2013/05/08	BBY6SOP-00022	SM-4500N C
Ammonia-N (Preserved)	2	N/A	2013/05/07	BBY6SOP-00009	SM-4500NH3G
Nitrate+Nitrite (N) (low level)	2	N/A	2013/05/04	BBY6SOP-00010	EPA 353.2
Nitrite (N) (low level)	2	N/A	2013/05/04	BBY6SOP-00010	SM 4500NO3-I
Nitrogen - Nitrate (as N)	2	N/A	2013/05/06	BBY6SOP-00010	SM 4500NO3-I
Nitrogen (Organic) (Cal. TKN, NH4,N/N)	2	N/A	2013/05/08		Calc
pH Water	2	N/A	2013/05/04	BBY6SOP-00026	SM-4500H+B
Orthophosphate by Konelab (low level)	2	N/A	2013/05/04	BBY6SOP-00013	SM 4500 P E
Sampling Altitude	2	N/A	2013/05/03		
Sampling Altitude	1	N/A	2013/05/14		
Sulphate by Automated Colourimetry	2	N/A	2013/05/06	BBY6SOP-00017	SM4500-SO42- E
Sampling Range	2	N/A	2013/05/03		
Sampling Range	1	N/A	2013/05/14		
TKN (Calc. TN, N/N) total	2	N/A	2013/05/08	BBY6SOP-00022	SM 4500N-C
Carbon (Total Organic)	2	N/A	2013/05/03	BBY6SOP-00003	SM-5310C
Phosphorus-P (Total, dissolved)	2	2013/05/04	2013/05/04	BBY6SOP-00013	SM-4500 PE
Total Phosphorus	2	N/A	2013/05/04	BBY6SOP-00013	SM 4500 P E
Turbidity	2	N/A	2013/05/04	BBY6SOP-00027	SM - 2130B
Field pH	1	N/A	2013/05/07		
Field Conductivity	1	N/A	2013/05/07		
Field Temperature	1	N/A	2013/05/07		
Field Turbidity	1	N/A	2013/05/07		
Field Dissolved Oxygen	1	N/A	2013/05/07		

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

* Results relate only to the items tested.

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Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Morgan Melnychuk, Burnaby Project Manager
Email: MMelnychuk@maxxam.ca
Phone# (604) 638-8034 Ext:8034

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

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RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		GH4987	GH4988	GH4989		
Sampling Date		2013/05/02 12:15	2013/05/02 12:40	2013/05/02 12:15		
COC#		50172967	50172967	50172967		
	UNITS	REG/1	REG/2	REG/3	RDL	QC Batch
Field Parameters						
Sample Depth Lower	m	8.0	25.0	22.8	0	6787300
Sample Depth Upper	m	0.5	20.0	0.5	0	6787300
Sample End Date	N/A	20130502	20130502	20130502	0	6787301
Sample End Time	N/A	12:25	12:50	12:45	0	6787301
Sample Start Date	N/A	20130502	20130502	20130502	0	6787301
Sample Start Time	N/A	12:15	12:40	12:15	0	6787301
Temperature at Arrival	C	2	2	2		6787313
Parameter						
Chlorophyll a	ug/L			2.3	1.0	6812240
Field-Vancouver						
Field Conductivity	uS/cm	1493			N/A	ONSITE
Field Dissolved Oxygen	mg/L	10.76			N/A	ONSITE
Field Temperature	°C	6.38			N/A	ONSITE
Field Turbidity	NTU	<0.1			N/A	ONSITE
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	674	625		0.50	6787232
Nitrate (N)	mg/L	<0.0020	0.0029		0.0020	6787487
Field Parameters						
Field Field pH	pH Units	8.82			N/A	ONSITE
Misc. Inorganics						
Dissolved Organic Carbon (C)	mg/L	22.5	23.5		0.50	6787684
Alkalinity (Total as CaCO3)	mg/L	971	968		0.50	6789680
Total Organic Carbon (C)	mg/L	24.0	24.7		0.50	6787685
Anions						
Orthophosphate (P)	mg/L	0.0016	0.0013		0.0010	6789889
Dissolved Sulphate (SO4)	mg/L	0.74	0.73		0.50	6793947
Dissolved Chloride (Cl)	mg/L	18	18		0.50	6793946

 N/A = Not Applicable
 RDL = Reportable Detection Limit



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Maxxam ID		GH4987	GH4988	GH4989		
Sampling Date		2013/05/02 12:15	2013/05/02 12:40	2013/05/02 12:15		
COC#		50172967	50172967	50172967		
	UNITS	REG/1	REG/2	REG/3	RDL	QC Batch
Nutrients						
Ammonia (N)	mg/L	0.082	0.099		0.0050	6795724
Total Kjeldahl Nitrogen (Calc)	mg/L	1.34	1.38		0.020	6787302
Total Organic Nitrogen (N)	mg/L	1.26	1.28		0.020	6787314
Dissolved Phosphorus (P)	mg/L	0.0060	0.0059		0.0020	6790027
Nitrate plus Nitrite (N)	mg/L	<0.0020	0.0029		0.0020	6790075
Nitrite (N)	mg/L	<0.0020	<0.0020		0.0020	6790076
Total Nitrogen (N)	mg/L	1.34	1.38		0.020	6795028
Total Phosphorus (P)	mg/L	0.0059	0.0062		0.0020	6790031
Physical Properties						
Conductivity	uS/cm	1510	1500		1.0	6789687
pH	pH Units	9.13	9.13			6789683
Physical Properties						
Turbidity	NTU	0.29	0.33		0.10	6789621

RDL = Reportable Detection Limit

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		GH4987	GH4988		
Sampling Date		2013/05/02 12:15	2013/05/02 12:40		
COC#		50172967	50172967		
	UNITS	REG/1	REG/2	RDL	QC Batch
ANIONS					
Bromide (Br)	mg/L	0.12(1)	0.12(1)	0.10	6801971

RDL = Reportable Detection Limit
 (1) - RDL raised due to sample matrix interference.

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		GH4987	GH4988		
Sampling Date		2013/05/02 12:15	2013/05/02 12:40		
COC#		50172967	50172967		
	UNITS	REG/1	REG/2	RDL	QC Batch
Total Metals by ICPMS					
Total Aluminum (Al)	ug/L	8.6	4.2	3.0	6795546
Total Antimony (Sb)	ug/L	<0.50	<0.50	0.50	6795546
Total Arsenic (As)	ug/L	0.50	0.49	0.10	6795546
Total Barium (Ba)	ug/L	<1.0	<1.0	1.0	6795546
Total Beryllium (Be)	ug/L	<0.10	<0.10	0.10	6795546
Total Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	6795546
Total Boron (B)	ug/L	<50	<50	50	6795546
Total Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6795546
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6795546
Total Cobalt (Co)	ug/L	<0.50	<0.50	0.50	6795546
Total Copper (Cu)	ug/L	0.25	<0.20	0.20	6795546
Total Iron (Fe)	ug/L	7.7	5.6	5.0	6795546
Total Lead (Pb)	ug/L	<0.20	<0.20	0.20	6795546
Total Manganese (Mn)	ug/L	<1.0	<1.0	1.0	6795546
Total Molybdenum (Mo)	ug/L	5.2	4.8	1.0	6795546
Total Nickel (Ni)	ug/L	<1.0	<1.0	1.0	6795546
Total Phosphorus (P)	ug/L	<10	<10	10	6795546
Total Selenium (Se)	ug/L	<0.10	<0.10	0.10	6795546
Total Silicon (Si)	ug/L	3240	3140	100	6795546
Total Silver (Ag)	ug/L	<0.020	<0.020	0.020	6795546
Total Strontium (Sr)	ug/L	3.6	3.2	1.0	6795546
Total Thallium (Tl)	ug/L	<0.050	<0.050	0.050	6795546
Total Tin (Sn)	ug/L	<5.0	<5.0	5.0	6795546
Total Titanium (Ti)	ug/L	<5.0	<5.0	5.0	6795546
Total Uranium (U)	ug/L	0.66	0.62	0.10	6795546
Total Vanadium (V)	ug/L	<5.0	<5.0	5.0	6795546
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6795546
Total Zirconium (Zr)	ug/L	<0.50	<0.50	0.50	6795546
Total Calcium (Ca)	mg/L	4.84	4.63	0.050	6787234
Total Magnesium (Mg)	mg/L	161	149	0.050	6787234
Total Potassium (K)	mg/L	15.1	14.1	0.050	6787234
Total Sodium (Na)	mg/L	206	193	0.050	6787234
Total Sulphur (S)	mg/L	<3.0	<3.0	3.0	6787234

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General Comments

Sample GH4987-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Sample GH4988-01: The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6787684	Dissolved Organic Carbon (C)	2013/05/03	NC	80 - 120	103	80 - 120	<0.50	mg/L	0.5	20
6787685	Total Organic Carbon (C)	2013/05/03	105	80 - 120	106	80 - 120	<0.50	mg/L	NC	20
6789621	Turbidity	2013/05/04			102	80 - 120	<0.10	NTU	NC	20
6789680	Alkalinity (Total as CaCO3)	2013/05/03	NC	80 - 120	100	80 - 120	0.90, RDL=0.50	mg/L	1.8	20
6789687	Conductivity	2013/05/04			100	80 - 120	<1.0	uS/cm	2.1	20
6789889	Orthophosphate (P)	2013/05/04	88	80 - 120	100	80 - 120	0.0016, RDL=0.0010	mg/L	6.2	20
6790027	Dissolved Phosphorus (P)	2013/05/04	95	80 - 120	103	80 - 120	<0.0020	mg/L	NC	20
6790031	Total Phosphorus (P)	2013/05/04	98	80 - 120	112	80 - 120	<0.0020	mg/L	NC	20
6790075	Nitrate plus Nitrite (N)	2013/05/04	102	80 - 120	102	80 - 120	<0.0020	mg/L	2.3	25
6790076	Nitrite (N)	2013/05/04	109	80 - 120	107	80 - 120	<0.0020	mg/L	NC	25
6793946	Dissolved Chloride (Cl)	2013/05/06	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.4	20
6793947	Dissolved Sulphate (SO4)	2013/05/06	NC	80 - 120	95	80 - 120	0.92, RDL=0.50	mg/L	NC	20
6795028	Total Nitrogen (N)	2013/05/08	NC	80 - 120	105	80 - 120	0.021, RDL=0.020	mg/L	2.0	20
6795546	Total Aluminum (Al)	2013/05/08	NC	80 - 120	115	80 - 120	<3.0	ug/L	11.4	20
6795546	Total Antimony (Sb)	2013/05/08	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
6795546	Total Arsenic (As)	2013/05/08	98	80 - 120	102	80 - 120	<0.10	ug/L	NC	20
6795546	Total Barium (Ba)	2013/05/08	NC	80 - 120	101	80 - 120	<1.0	ug/L	9.9	20
6795546	Total Beryllium (Be)	2013/05/08	100	80 - 120	98	80 - 120	<0.10	ug/L	NC	20
6795546	Total Bismuth (Bi)	2013/05/08	102	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
6795546	Total Cadmium (Cd)	2013/05/08	99	80 - 120	102	80 - 120	<0.010	ug/L	NC	20
6795546	Total Chromium (Cr)	2013/05/08	109	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
6795546	Total Cobalt (Co)	2013/05/08	104	80 - 120	105	80 - 120	<0.50	ug/L	NC	20
6795546	Total Copper (Cu)	2013/05/08	107	80 - 120	103	80 - 120	<0.20	ug/L	7.6	20
6795546	Total Iron (Fe)	2013/05/08	NC	80 - 120	117	80 - 120	<5.0	ug/L	10.7	20
6795546	Total Lead (Pb)	2013/05/08	103	80 - 120	102	80 - 120	<0.20	ug/L	NC	20
6795546	Total Manganese (Mn)	2013/05/08	108	80 - 120	107	80 - 120	<1.0	ug/L	NC	20
6795546	Total Molybdenum (Mo)	2013/05/08	NC	80 - 120	109	80 - 120	<1.0	ug/L	NC	20
6795546	Total Nickel (Ni)	2013/05/08	106	80 - 120	104	80 - 120	<1.0	ug/L	NC	20
6795546	Total Selenium (Se)	2013/05/08	97	80 - 120	105	80 - 120	<0.10	ug/L	NC	20
6795546	Total Silver (Ag)	2013/05/08	97	80 - 120	90	80 - 120	<0.020	ug/L	NC	20
6795546	Total Strontium (Sr)	2013/05/08	NC	80 - 120	103	80 - 120	<1.0	ug/L	9.8	20
6795546	Total Thallium (Tl)	2013/05/08	108	80 - 120	106	80 - 120	<0.050	ug/L	NC	20
6795546	Total Tin (Sn)	2013/05/08	104	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
6795546	Total Titanium (Ti)	2013/05/08	100	80 - 120	82	80 - 120	<5.0	ug/L	NC	20
6795546	Total Uranium (U)	2013/05/08	106	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
6795546	Total Vanadium (V)	2013/05/08	109	80 - 120	100	80 - 120	<5.0	ug/L	NC	20
6795546	Total Zinc (Zn)	2013/05/08	112	80 - 120	109	80 - 120	<5.0	ug/L	NC	20
6795546	Total Boron (B)	2013/05/08					<50	ug/L	NC	20
6795546	Total Phosphorus (P)	2013/05/08					<10	ug/L		
6795546	Total Silicon (Si)	2013/05/08					<100	ug/L	2.6	20

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QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6795546	Total Zirconium (Zr)	2013/05/08					<0.50	ug/L	NC	20
6795724	Ammonia (N)	2013/05/07	NC	80 - 120	101	80 - 120	<0.0050	mg/L	6.4	20
6801971	Bromide (Br)	2013/05/10	100	78 - 120	99	80 - 120	<0.010	mg/L	NC	20
6812240	Chlorophyll a	2013/05/14			109	80 - 120	<0.50	ug/L		

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, Data Validation Coordinator

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