

CERTIFICATE OF ANALYSIS

REPORTED TO Passmore Laboratory Ltd
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ATTENTION Jennifer Yeow

WORK ORDER 7081129

PO NUMBER

RECEIVED / TEMP 2017-08-14 09:15 / 23°C

PROJECT Slocan

REPORTED 2017-08-18

PROJECT INFO

COC NUMBER No Number

General Comments:

CARO Analytical Services employs methods which are conducted according to procedures accepted by appropriate regulatory agencies, and/or are conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts, except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the Chain of Custody or Sample Requisition document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.



Authorized By:

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Analysis Description	Method Reference	Technique	Location
Hardness (as CaCO ₃) in Water	APHA 2340 B*	Calculation: 2.497 [total Ca] + 4.118 [total Mg] (Estimated)	N/A
Total Metals by ICPMS in Water	APHA 3030 E* / APHA 3125 B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma Mass Spectrometry (ICP-MS)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Method Reference Descriptions:

APHA Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Association/American Water Works Association/Water Environment Federation

Glossary of Terms:

MRL Method Reporting Limit
 < Less than the Reported Detection Limit (RDL) - the RDL may be higher than the MRL due to various factors such as dilutions, limited sample volume, high moisture, or interferences
 AO Aesthetic objective
 MAC Maximum acceptable concentration (health based)
 OG Operational guideline (treated water)
 mg/L Milligrams per litre

Standards / Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Feb 2017)

Website: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

SAMPLE ANALYTICAL DATA

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Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: Springer Creek (7081129-01) [Water] Sampled: 2017-08-07 13:10

Calculated Parameters

Hardness, Total (as CaCO ₃)	41.7	N/A	0.500	mg/L	N/A	N/A	
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Total Metals

Aluminum, total	0.0211	OG < 0.1	0.0050	mg/L	2017-08-15	2017-08-17	
Antimony, total	< 0.00010	MAC = 0.006	0.00010	mg/L	2017-08-15	2017-08-17	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2017-08-15	2017-08-17	
Barium, total	0.0136	MAC = 1	0.0050	mg/L	2017-08-15	2017-08-17	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Boron, total	< 0.0050	MAC = 5	0.0050	mg/L	2017-08-15	2017-08-17	
Cadmium, total	0.000090	MAC = 0.005	0.000010	mg/L	2017-08-15	2017-08-17	
Calcium, total	13.4	N/A	0.20	mg/L	2017-08-15	2017-08-17	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-08-15	2017-08-17	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Copper, total	0.00036	AO ≤ 1	0.00020	mg/L	2017-08-15	2017-08-17	
Iron, total	0.013	AO ≤ 0.3	0.010	mg/L	2017-08-15	2017-08-17	
Lead, total	< 0.00010	MAC = 0.01	0.00010	mg/L	2017-08-15	2017-08-17	
Lithium, total	0.00130	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Magnesium, total	1.96	N/A	0.010	mg/L	2017-08-15	2017-08-17	
Manganese, total	0.00070	AO ≤ 0.05	0.00020	mg/L	2017-08-15	2017-08-17	
Molybdenum, total	0.00134	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Nickel, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2017-08-15	2017-08-17	
Potassium, total	0.67	N/A	0.10	mg/L	2017-08-15	2017-08-17	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-08-15	2017-08-17	
Silicon, total	3.7	N/A	1.0	mg/L	2017-08-15	2017-08-17	
Silver, total	< 0.000050	N/A	0.000050	mg/L	2017-08-15	2017-08-17	
Sodium, total	1.56	AO ≤ 200	0.10	mg/L	2017-08-15	2017-08-17	
Strontium, total	0.133	N/A	0.0010	mg/L	2017-08-15	2017-08-17	
Sulfur, total	< 3.0	N/A	3.0	mg/L	2017-08-15	2017-08-17	
Tellurium, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2017-08-15	2017-08-17	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2017-08-15	2017-08-17	
Uranium, total	0.000517	MAC = 0.02	0.000020	mg/L	2017-08-15	2017-08-17	
Vanadium, total	< 0.0010	N/A	0.0010	mg/L	2017-08-15	2017-08-17	
Zinc, total	0.0132	AO ≤ 5	0.0040	mg/L	2017-08-15	2017-08-17	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	

Sample ID: Lemon Creek (7081129-02) [Water] Sampled: 2017-08-07 13:30

Calculated Parameters

Hardness, Total (as CaCO ₃)	34.2	N/A	0.500	mg/L	N/A	N/A	
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Total Metals

SAMPLE ANALYTICAL DATA

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Analyte	Result / Recovery	Standard / Guideline	MRL / Limits	Units	Prepared	Analyzed	Notes
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Sample ID: Lemon Creek (7081129-02) [Water] Sampled: 2017-08-07 13:30, Continued

Total Metals, Continued

Aluminum, total	0.0147	OG < 0.1	0.0050	mg/L	2017-08-15	2017-08-17	
Antimony, total	< 0.00010	MAC = 0.006	0.00010	mg/L	2017-08-15	2017-08-17	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2017-08-15	2017-08-17	
Barium, total	0.0097	MAC = 1	0.0050	mg/L	2017-08-15	2017-08-17	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Boron, total	< 0.0050	MAC = 5	0.0050	mg/L	2017-08-15	2017-08-17	
Cadmium, total	0.000011	MAC = 0.005	0.000010	mg/L	2017-08-15	2017-08-17	
Calcium, total	11.5	N/A	0.20	mg/L	2017-08-15	2017-08-17	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-08-15	2017-08-17	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Copper, total	< 0.00020	AO ≤ 1	0.00020	mg/L	2017-08-15	2017-08-17	
Iron, total	< 0.010	AO ≤ 0.3	0.010	mg/L	2017-08-15	2017-08-17	
Lead, total	< 0.00010	MAC = 0.01	0.00010	mg/L	2017-08-15	2017-08-17	
Lithium, total	0.00115	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Magnesium, total	1.32	N/A	0.010	mg/L	2017-08-15	2017-08-17	
Manganese, total	0.00048	AO ≤ 0.05	0.00020	mg/L	2017-08-15	2017-08-17	
Molybdenum, total	0.00220	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Nickel, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2017-08-15	2017-08-17	
Potassium, total	0.85	N/A	0.10	mg/L	2017-08-15	2017-08-17	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2017-08-15	2017-08-17	
Silicon, total	3.5	N/A	1.0	mg/L	2017-08-15	2017-08-17	
Silver, total	< 0.000050	N/A	0.000050	mg/L	2017-08-15	2017-08-17	
Sodium, total	1.51	AO ≤ 200	0.10	mg/L	2017-08-15	2017-08-17	
Strontium, total	0.0910	N/A	0.0010	mg/L	2017-08-15	2017-08-17	
Sulfur, total	< 3.0	N/A	3.0	mg/L	2017-08-15	2017-08-17	
Tellurium, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2017-08-15	2017-08-17	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2017-08-15	2017-08-17	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2017-08-15	2017-08-17	
Uranium, total	0.00190	MAC = 0.02	0.000020	mg/L	2017-08-15	2017-08-17	
Vanadium, total	< 0.0010	N/A	0.0010	mg/L	2017-08-15	2017-08-17	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2017-08-15	2017-08-17	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2017-08-15	2017-08-17	

APPENDIX 1: QUALITY CONTROL DATA

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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** Laboratory reagent water is carried through sample preparation and analysis steps. Method Blanks indicate that results are free from contamination, i.e. not biased high from sources such as the sample container or the laboratory environment
- **Duplicate (Dup):** Preparation and analysis of a replicate aliquot of a sample. Duplicates provide a measure of the analytical method's precision, i.e. how reproducible a result is. Duplicates are only reported if they are associated with your sample data.
- **Blank Spike (BS):** A known amount of standard is carried through sample preparation and analysis steps. Blank Spikes, also known as laboratory control samples (LCS), are prepared from a different source of standard than used for the calibration. They ensure that the calibration is acceptable (i.e. not biased high or low) and also provide a measure of the analytical method's accuracy (i.e. closeness of the result to a target value).
- **Standard Reference Material (SRM):** A material of similar matrix to the samples, externally certified for the parameter(s) listed. Standard Reference Materials ensure that the preparation steps in the method are adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Total Metals, Batch B7H1108

Blank (B7H1108-BLK1)

Prepared: 2017-08-15, Analyzed: 2017-08-17

Aluminum, total	< 0.0050	0.0050 mg/L							
Antimony, total	< 0.00010	0.00010 mg/L							
Arsenic, total	< 0.00050	0.00050 mg/L							
Barium, total	< 0.0050	0.0050 mg/L							
Beryllium, total	< 0.00010	0.00010 mg/L							
Bismuth, total	< 0.00010	0.00010 mg/L							
Boron, total	< 0.0050	0.0050 mg/L							
Cadmium, total	< 0.000010	0.000010 mg/L							
Calcium, total	< 0.20	0.20 mg/L							
Chromium, total	< 0.00050	0.00050 mg/L							
Cobalt, total	< 0.00010	0.00010 mg/L							
Copper, total	< 0.00020	0.00020 mg/L							
Iron, total	< 0.010	0.010 mg/L							
Lead, total	< 0.00010	0.00010 mg/L							
Lithium, total	< 0.00010	0.00010 mg/L							
Magnesium, total	< 0.010	0.010 mg/L							
Manganese, total	< 0.00020	0.00020 mg/L							
Molybdenum, total	< 0.00010	0.00010 mg/L							
Nickel, total	< 0.00020	0.00020 mg/L							
Phosphorus, total	< 0.050	0.050 mg/L							
Potassium, total	< 0.10	0.10 mg/L							
Selenium, total	< 0.00050	0.00050 mg/L							
Silicon, total	< 1.0	1.0 mg/L							
Silver, total	< 0.000050	0.000050 mg/L							
Sodium, total	< 0.10	0.10 mg/L							
Strontium, total	< 0.0010	0.0010 mg/L							
Sulfur, total	< 3.0	3.0 mg/L							
Tellurium, total	< 0.00020	0.00020 mg/L							
Thallium, total	< 0.000020	0.000020 mg/L							
Thorium, total	< 0.00010	0.00010 mg/L							
Tin, total	< 0.00020	0.00020 mg/L							
Titanium, total	< 0.0050	0.0050 mg/L							

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
Total Metals, Batch B7H1108, Continued									
Blank (B7H1108-BLK1), Continued					Prepared: 2017-08-15, Analyzed: 2017-08-17				
Uranium, total	< 0.000020	0.000020 mg/L							
Vanadium, total	< 0.0010	0.0010 mg/L							
Zinc, total	< 0.0040	0.0040 mg/L							
Zirconium, total	< 0.00010	0.00010 mg/L							
LCS (B7H1108-BS1)					Prepared: 2017-08-15, Analyzed: 2017-08-17				
Aluminum, total	0.0222	0.0050 mg/L	0.0200		111	80-120			
Antimony, total	0.0189	0.00010 mg/L	0.0200		94	80-120			
Arsenic, total	0.0188	0.00050 mg/L	0.0200		94	80-120			
Barium, total	0.0182	0.0050 mg/L	0.0200		91	80-120			
Beryllium, total	0.0210	0.00010 mg/L	0.0200		105	80-120			
Bismuth, total	0.0208	0.00010 mg/L	0.0200		104	80-120			
Boron, total	0.0208	0.0050 mg/L	0.0200		104	80-120			
Cadmium, total	0.0194	0.000010 mg/L	0.0200		97	80-120			
Calcium, total	2.04	0.20 mg/L	2.00		102	80-120			
Chromium, total	0.0200	0.00050 mg/L	0.0200		100	80-120			
Cobalt, total	0.0204	0.00010 mg/L	0.0200		102	80-120			
Copper, total	0.0216	0.00020 mg/L	0.0200		108	80-120			
Iron, total	1.96	0.010 mg/L	2.00		98	80-120			
Lead, total	0.0206	0.00010 mg/L	0.0200		103	80-120			
Lithium, total	0.0209	0.00010 mg/L	0.0200		104	80-120			
Magnesium, total	2.32	0.010 mg/L	2.00		116	80-120			
Manganese, total	0.0192	0.00020 mg/L	0.0200		96	80-120			
Molybdenum, total	0.0184	0.00010 mg/L	0.0200		92	80-120			
Nickel, total	0.0200	0.00020 mg/L	0.0200		100	80-120			
Phosphorus, total	2.13	0.050 mg/L	2.00		107	80-120			
Potassium, total	2.26	0.10 mg/L	2.00		113	80-120			
Selenium, total	0.0226	0.00050 mg/L	0.0200		113	80-120			
Silicon, total	1.9	1.0 mg/L	2.00		97	80-120			
Silver, total	0.0202	0.000050 mg/L	0.0200		101	80-120			
Sodium, total	2.34	0.10 mg/L	2.40		98	80-120			
Strontium, total	0.0183	0.0010 mg/L	0.0200		92	80-120			
Sulfur, total	5.5	3.0 mg/L	5.00		110	80-120			
Tellurium, total	0.0192	0.00020 mg/L	0.0200		96	80-120			
Thallium, total	0.0207	0.000020 mg/L	0.0200		103	80-120			
Thorium, total	0.0198	0.00010 mg/L	0.0200		99	80-120			
Tin, total	0.0195	0.00020 mg/L	0.0200		97	80-120			
Titanium, total	0.0203	0.0050 mg/L	0.0200		102	80-120			
Uranium, total	0.0203	0.000020 mg/L	0.0200		101	80-120			
Vanadium, total	0.0196	0.0010 mg/L	0.0200		98	80-120			
Zinc, total	0.0207	0.0040 mg/L	0.0200		104	80-120			
Zirconium, total	0.0204	0.00010 mg/L	0.0200		102	80-120			
Reference (B7H1108-SRM1)					Prepared: 2017-08-15, Analyzed: 2017-08-17				
Aluminum, total	0.313	0.0050 mg/L	0.303		103	82-114			
Antimony, total	0.0472	0.00010 mg/L	0.0511		92	88-115			
Arsenic, total	0.110	0.00050 mg/L	0.118		94	88-111			
Barium, total	0.704	0.0050 mg/L	0.823		86	83-108			
Beryllium, total	0.0464	0.00010 mg/L	0.0496		94	80-119			
Boron, total	3.12	0.0050 mg/L	3.45		90	80-118			
Cadmium, total	0.0463	0.000010 mg/L	0.0495		94	90-110			
Calcium, total	10.5	0.20 mg/L	11.6		91	85-113			
Chromium, total	0.249	0.00050 mg/L	0.250		100	88-111			
Cobalt, total	0.0387	0.00010 mg/L	0.0377		103	93-114			
Copper, total	0.511	0.00020 mg/L	0.486		105	95-117			
Iron, total	0.489	0.010 mg/L	0.488		100	90-116			
Lead, total	0.189	0.00010 mg/L	0.204		93	91-110			

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Analyte	Result	MRL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Notes
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Total Metals, Batch B7H1108, Continued

Reference (B7H1108-SRM1), Continued

Prepared: 2017-08-15, Analyzed: 2017-08-17

Lithium, total	0.369	0.00010 mg/L	0.403		92	79-118			
Magnesium, total	4.21	0.010 mg/L	3.79		111	88-116			
Manganese, total	0.102	0.00020 mg/L	0.109		94	88-108			
Molybdenum, total	0.185	0.00010 mg/L	0.198		94	88-110			
Nickel, total	0.250	0.00020 mg/L	0.249		100	91-112			
Phosphorus, total	0.220	0.050 mg/L	0.227		97	72-118			
Potassium, total	7.92	0.10 mg/L	7.21		110	87-116			
Selenium, total	0.132	0.00050 mg/L	0.121		109	92-122			
Sodium, total	8.53	0.10 mg/L	7.54		113	86-118			
Strontium, total	0.341	0.0010 mg/L	0.375		91	86-110			
Thallium, total	0.0761	0.000020 mg/L	0.0805		95	94-113			
Uranium, total	0.0280	0.000020 mg/L	0.0306		91	88-112			
Vanadium, total	0.376	0.0010 mg/L	0.386		97	87-109			
Zinc, total	2.40	0.0040 mg/L	2.49		96	90-113			