



CERTIFICATE OF ANALYSIS

REPORTED TO	Yukon Government - Department of Education 1000 Lewes Blvd. Whitehorse, YT Y1A 6N2	WORK ORDER	8081755
ATTENTION	Miles Hume	RECEIVED / TEMP REPORTED	2018-08-15 12:00 / 18°C 2018-08-27 18:10
PO NUMBER		COC NUMBER	B65307/06/08
PROJECT	Department of Education 2018 Water Testing Program		
PROJECT INFO	Contract No. C00044694 (Golden)		

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

Extra samples not listed on COC: DF2, CS4, DF7, BS11, BS12, BS13, BS14

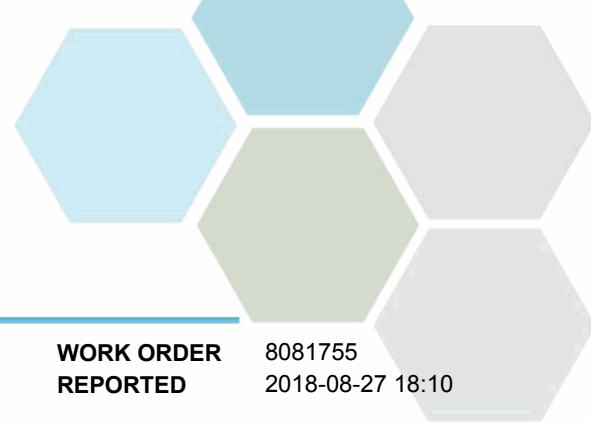
If you have any questions or concerns, please contact me at machan@caro.ca

Authorized By:

Maggie Chan, DipT
Client Service Representative

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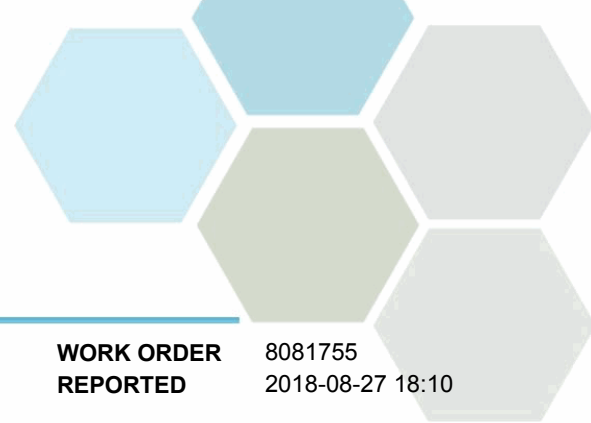


TEST RESULTS

REPORTED TO PROJECT Yukon Government - Department of Education
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Analyte	Result	RL	Units	Analyzed	Qualifier
CS1 (8081755-01) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	26.2	0.20	µg/L	2018-08-25	
CS2 (8081755-02) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	22.9	0.20	µg/L	2018-08-25	
CS3 (8081755-03) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	8.18	0.20	µg/L	2018-08-25	
CS4 (8081755-04) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	10.1	0.20	µg/L	2018-08-25	
CS5 (8081755-05) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	26.8	0.20	µg/L	2018-08-25	
CS6 (8081755-06) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	23.9	0.20	µg/L	2018-08-25	
CS7 (8081755-07) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	8.76	0.20	µg/L	2018-08-25	
CS8 (8081755-08) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	2.47	0.20	µg/L	2018-08-25	
CS9 (8081755-09) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					

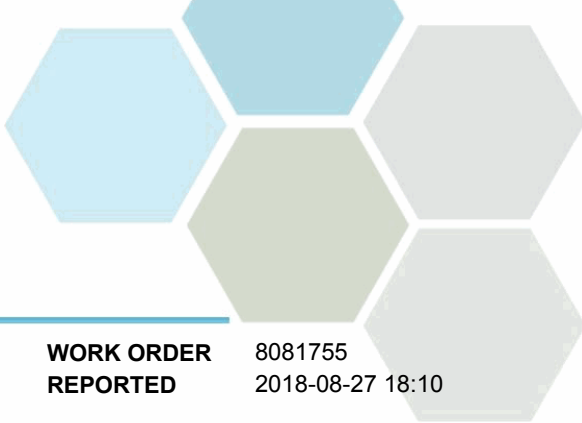


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Analyte	Result	RL	Units	Analyzed	Qualifier
CS9 (8081755-09) Matrix: Water Sampled: 2018-08-14 08:00, Continued					
<i>Total Metals, Continued</i>					
Lead, total	1.58	0.20	µg/L	2018-08-25	
CS10 (8081755-10) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	5.34	0.20	µg/L	2018-08-25	
CS11 (8081755-11) Matrix: Water Sampled: 2018-08-14 08:00					
<i>Total Metals</i>					
Lead, total	3.00	0.20	µg/L	2018-08-25	
CS12 (8081755-12) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	0.61	0.20	µg/L	2018-08-25	
CS13 (8081755-13) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	1.12	0.20	µg/L	2018-08-25	
CS14 (8081755-14) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	0.86	0.20	µg/L	2018-08-25	
BS1 (8081755-15) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	8.06	0.20	µg/L	2018-08-25	
BS3 (8081755-17) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	48.9	0.20	µg/L	2018-08-25	
BS4 (8081755-18) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					

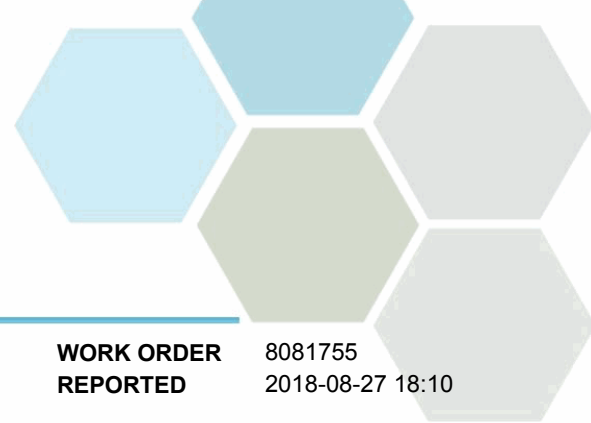


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Analyte	Result	RL	Units	Analyzed	Qualifier
BS4 (8081755-18) Matrix: Water Sampled: 2018-08-14 08:15, Continued					
<i>Total Metals, Continued</i>					
Lead, total	2.62	0.20	µg/L	2018-08-25	
BS5 (8081755-19) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	3.75	0.20	µg/L	2018-08-25	
BS6 (8081755-20) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	2.46	0.20	µg/L	2018-08-25	
BS7 (8081755-21) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	7.10	0.20	µg/L	2018-08-25	
BS8 (8081755-22) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	19.4	0.20	µg/L	2018-08-25	
BS9 (8081755-23) Matrix: Water Sampled: 2018-08-14 08:15					
<i>Total Metals</i>					
Lead, total	6.54	0.20	µg/L	2018-08-25	
BS10 (8081755-24) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	8.36	0.20	µg/L	2018-08-25	
KS1 (8081755-25) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.52	0.20	µg/L	2018-08-25	
KS2 (8081755-26) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					

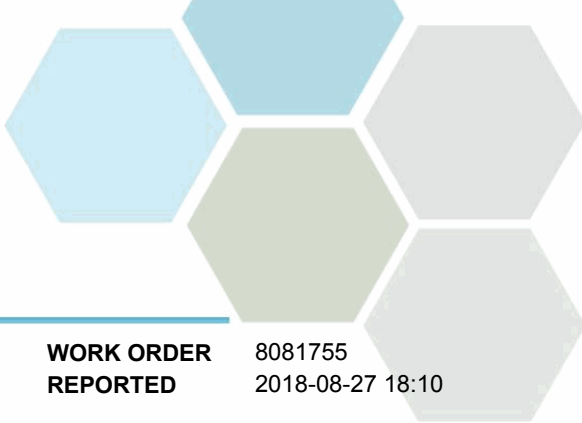


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Analyte	Result	RL	Units	Analyzed	Qualifier
KS2 (8081755-26) Matrix: Water Sampled: 2018-08-14 08:30, Continued					
<i>Total Metals, Continued</i>					
Lead, total	2.21	0.20	µg/L	2018-08-25	
DF1 (8081755-27) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.48	0.20	µg/L	2018-08-25	
DF2 (8081755-28) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	6.59	0.20	µg/L	2018-08-25	
DF3 (8081755-29) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.37	0.20	µg/L	2018-08-25	
DF4 (8081755-30) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	0.71	0.20	µg/L	2018-08-25	
DF5 (8081755-31) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	0.81	0.20	µg/L	2018-08-25	
DF6 (8081755-32) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	2.87	0.20	µg/L	2018-08-25	
CS2-Tier2 (8081755-33) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	2.10	0.20	µg/L	2018-08-25	
DF2 (8081755-34) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					

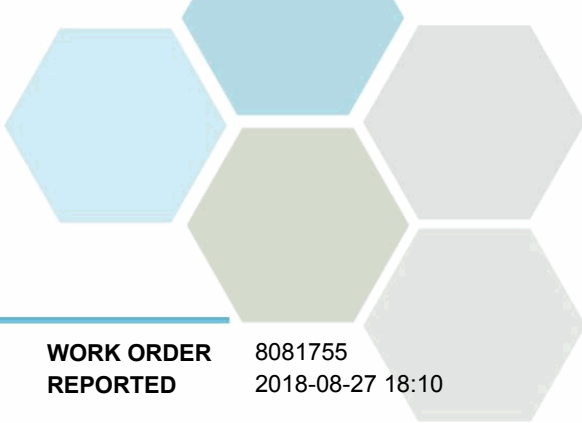


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Analyte	Result	RL	Units	Analyzed	Qualifier
DF2 (8081755-34) Matrix: Water Sampled: 2018-08-14 08:30, Continued					
<i>Total Metals, Continued</i>					
Lead, total	2.10	0.20	µg/L	2018-08-26	
CS4 (8081755-35) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	15.6	0.20	µg/L	2018-08-26	
DF7 (8081755-36) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.27	0.20	µg/L	2018-08-26	
BS11 (8081755-37) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.10	0.20	µg/L	2018-08-26	
BS12 (8081755-38) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.65	0.20	µg/L	2018-08-26	
BS13 (8081755-39) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	0.88	0.20	µg/L	2018-08-26	
BS14 (8081755-40) Matrix: Water Sampled: 2018-08-14 08:30					
<i>Total Metals</i>					
Lead, total	1.81	0.20	µg/L	2018-08-26	



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Yukon Government - Department of Education
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Analysis Description	Method Ref.	Technique	Location
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO ₃ +HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond

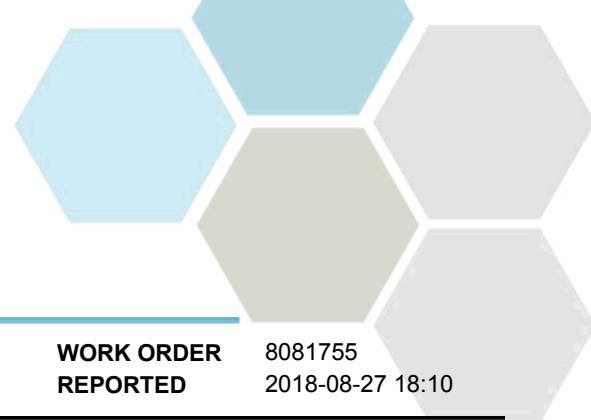
Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
µg/L	Micrograms per litre
EPA	United States Environmental Protection Agency Test Methods

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody 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.



APPENDIX 2: QUALITY CONTROL RESULTS

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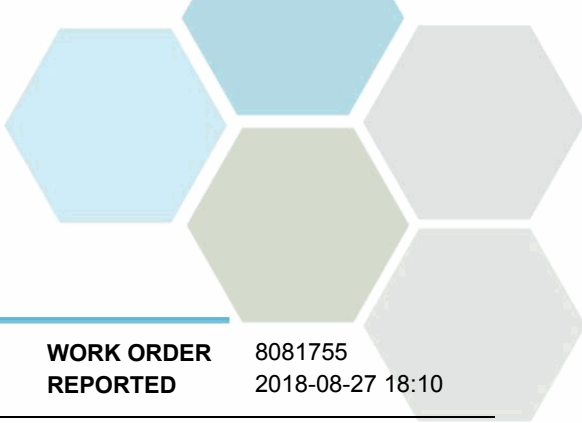
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC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

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is 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 10-20 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	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8H1681									
Blank (B8H1681-BLK1)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	< 0.20	0.20 µg/L							
Blank (B8H1681-BLK2)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	< 0.20	0.20 µg/L							
LCS (B8H1681-BS1)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	20.9	0.20 µg/L	20.0		105	80-120			
LCS (B8H1681-BS2)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	20.8	0.20 µg/L	20.0		104	80-120			
Duplicate (B8H1681-DUP2)			Source: 8081755-01 Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	26.3	0.20 µg/L		26.2			< 1	20	
Reference (B8H1681-SRM1)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	207	0.20 µg/L	204		101	90-110			
Reference (B8H1681-SRM2)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	206	0.20 µg/L	204		101	90-110			
Total Metals, Batch B8H1682									
Blank (B8H1682-BLK1)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	< 0.20	0.20 µg/L							
Blank (B8H1682-BLK2)			Prepared: 2018-08-21, Analyzed: 2018-08-26						
Lead, total	< 0.20	0.20 µg/L							
LCS (B8H1682-BS1)			Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	20.9	0.20 µg/L	20.0		104	80-120			
LCS (B8H1682-BS2)			Prepared: 2018-08-21, Analyzed: 2018-08-26						
Lead, total	20.9	0.20 µg/L	20.0		104	80-120			
Duplicate (B8H1682-DUP1)			Source: 8081755-21 Prepared: 2018-08-21, Analyzed: 2018-08-25						
Lead, total	7.10	0.20 µg/L		7.10			< 1	20	



APPENDIX 2: QUALITY CONTROL RESULTS

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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8H1682, Continued									
Reference (B8H1682-SRM1)				Prepared: 2018-08-21, Analyzed: 2018-08-25					
Lead, total	209	0.20 µg/L	204		103	90-110			
Reference (B8H1682-SRM2)				Prepared: 2018-08-21, Analyzed: 2018-08-26					
Lead, total	211	0.20 µg/L	204		103	90-110			