

CERTIFICATE OF ANALYSIS

Work Order	: VA23C3171	Page	: 1 of 6
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: ALS Environmental - Vancouver
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
Address	: PO Box 4357 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MWMt 2023	Date Samples Received	: 28-Sep-2023 12:30
PO	: ----	Date Analysis Commenced	: 30-Sep-2023
C-O-C number	: 20-1068887	Issue Date	: 13-Oct-2023 13:37
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Virginia Smith	Account Manager Assistant	Administration, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
%	percent
°C	degrees celsius
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

Sub-Matrix: Water					Client sample ID	Cutthroat Creek	Nanika River	McBride Creek	Cutthroat Creek DUP	----
(Matrix: Water)										
Client sampling date / time						28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C3171-001	VA23C3171-002	VA23C3171-003	VA23C3171-004	-----	
					Result	Result	Result	Result	----	
Field Tests										
Conductivity, field	----	EF001/VA	0.10	µS/cm	52.900	57.900	49.400	----	----	----
Oxygen, dissolved saturation %, field	----	EF001/VA	0.1	%	60	90	68	----	----	----
Oxygen, dissolved, field	----	EF001/VA	0.01	mg/L	7.1	10.2	8.4	----	----	----
pH, field	----	EF001/VA	0.10	pH units	7.01	7.80	6.95	----	----	----
Temperature, field	----	EF001/VA	0.10	°C	8.40	10.0	6.80	----	----	----
Physical Tests										
Alkalinity, total (as CaCO ₃)	----	E290/VA	1.0	mg/L	22.1	16.9	22.9	19.5	----	----
Hardness (as CaCO ₃), dissolved	----	EC100/VA	0.50	mg/L	20.0	21.9	17.8	20.5	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	37	33	40	38	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L	<3.0	<3.0	4.4	<3.0	----	----
Turbidity	----	E121/VA	0.10	NTU	1.74	1.35	1.02	2.00	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	0.0057	<0.0050	----	----
Kjeldahl nitrogen, total [TKN]	----	EC318/VA	0.050	mg/L	0.304	<0.050	0.192	0.263	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	<0.0050	0.0513	<0.0050	<0.0050	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	<0.0051	0.0513	<0.0051	<0.0051	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	0.304	0.071	0.192	0.263	----	----
Nitrogen, total dissolved	----	E368/VA	0.030	mg/L	0.317	0.066	0.191	0.232	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	0.0208	0.0030	0.0070	0.0253	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	4.12	1.34	8.38	4.38	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0875	0.0683	0.243	0.0559	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00048	0.00016	0.00040	0.00041	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.0154	0.0155	0.0179	0.0146	----	----



Analytical Results

Sub-Matrix: Water					Client sample ID	Cutthroat Creek	Nanika River	McBride Creek	Cutthroat Creek DUP	----
(Matrix: Water)										
Client sampling date / time						28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C3171-001	VA23C3171-002	VA23C3171-003	VA23C3171-004	-----	
					Result	Result	Result	Result	----	
Total Metals										
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020		----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050		----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010		----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	0.0000055	0.0000125	0.0000221	<0.0000050		----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	7.10	7.52	5.25	7.11		----
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	0.000013	0.000017	0.000018	<0.000010		----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050		----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	0.00047	<0.00010	0.00020	0.00028		----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	<0.00050	0.00150	0.00128	<0.00050		----
Iron, total	7439-89-6	E420/VA	0.010	mg/L	1.77	0.099	0.371	1.29		----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	0.000130	0.000050	0.000072	0.000093		----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010		----
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	0.630	0.683	1.11	0.636		----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.230	0.00544	0.135	0.129		----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.000095	0.000669	0.000106	0.000078		----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050		----
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050		----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	0.221	0.252	0.343	0.207		----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00048	0.00032	0.00051	0.00040		----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	<0.000050	0.000054	<0.000050		----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	1.44	1.43	3.55	1.42		----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	<0.000010	0.000013	<0.000010		----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	0.849	0.718	2.19	0.856		----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.0272	0.0363	0.0465	0.0274		----
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	0.87	2.19	<0.50	0.80		----
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020		----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010		----
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010		----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010		----
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	0.00169	0.00106	0.00337	0.00114		----



Analytical Results

Sub-Matrix: Water					Client sample ID	Cutthroat Creek	Nanika River	McBride Creek	Cutthroat Creek DUP	----
(Matrix: Water)										
Client sampling date / time					28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C3171-001	VA23C3171-002	VA23C3171-003	VA23C3171-004	-----	
					Result	Result	Result	Result	----	
Total Metals										
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	<0.000010	0.000033	0.000035	<0.000010	----	
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	0.00050	<0.00050	0.00078	<0.00050	----	
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	----	
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	<0.00020	0.00027	<0.00020	----	
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0177	0.0152	0.116	0.0182	----	
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00028	0.00014	0.00025	0.00028	----	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.0135	0.0143	0.0158	0.0137	----	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	----	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000106	0.0000201	<0.0000050	----	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	6.91	7.57	5.21	7.11	----	
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	0.00012	<0.00010	<0.00010	0.00013	----	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	0.00111	0.00095	<0.00020	----	
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.453	0.018	0.084	0.466	----	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L	0.676	0.720	1.16	0.670	----	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.0697	0.00163	0.0523	0.0696	----	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	<0.000050	0.000644	0.000090	0.000052	----	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L	0.212	0.262	0.350	0.201	----	
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L	0.00037	0.00027	0.00043	0.00034	----	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000065	0.000056	0.000074	0.000055	----	



Analytical Results

Sub-Matrix: Water					Client sample ID	Cutthroat Creek	Nanika River	McBride Creek	Cutthroat Creek DUP	----
(Matrix: Water)										
					Client sampling date / time	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	28-Sep-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C3171-001	VA23C3171-002	VA23C3171-003	VA23C3171-004	-----	
					Result	Result	Result	Result	----	
Dissolved Metals										
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	1.34	1.32	3.39	1.34	----	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	0.000012	<0.000010	----	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	0.922	0.748	2.16	0.900	----	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0265	0.0356	0.0438	0.0263	----	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.84	2.18	<0.50	0.86	----	
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	0.00067	<0.00030	----	
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	0.000029	0.000026	<0.000010	----	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Zirconium, dissolved	7440-67-7	E421/VA	0.00030	mg/L	<0.00030	<0.00030	0.00032	<0.00030	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA23C3171	Page	: 1 of 15
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: ALS Environmental - Vancouver
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
Address	: PO Box 4357 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: MWMT 2023	Date Samples Received	: 28-Sep-2023 12:30
PO	: ----	Issue Date	: 13-Oct-2023 13:37
C-O-C number	: 20-1068887		
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Total Metals	QC-1166436-002	----	Iron, total	7439-89-6	E420	123 % ^{MES}	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier Description

MES *Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Matrix Spike (MS) Recoveries

Dissolved Metals	VA23C3171-002	Nanika River	Thorium, dissolved	7440-29-1	E421	68.6 % ^{MES}	70.0-130%	Recovery less than lower data quality objective
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Result Qualifiers

Qualifier Description

MES *Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Cutthroat Creek	E298	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Cutthroat Creek DUP	E298	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) McBride Creek	E298	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Nanika River	E298	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Cutthroat Creek	E235.NO3-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Cutthroat Creek DUP	E235.NO3-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE McBride Creek	E235.NO3-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Nanika River	E235.NO3-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Cutthroat Creek	E235.NO2-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Cutthroat Creek DUP	E235.NO2-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE McBride Creek	E235.NO2-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Nanika River	E235.NO2-L	28-Sep-2023	30-Sep-2023	3 days	2 days	✓	30-Sep-2023	3 days	2 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Cutthroat Creek	E368	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Cutthroat Creek DUP	E368	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) McBride Creek	E368	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Nanika River	E368	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Cutthroat Creek	E366	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Cutthroat Creek DUP	E366	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) McBride Creek	E366	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Nanika River	E366	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Cutthroat Creek	E372-U	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Cutthroat Creek DUP	E372-U	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) McBride Creek	E372-U	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Nanika River	E372-U	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	10-Oct-2023	28 days	13 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Cutthroat Creek	E421	28-Sep-2023	05-Oct-2023	180 days	7 days	✓	07-Oct-2023	180 days	9 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Cutthroat Creek DUP	E421	28-Sep-2023	05-Oct-2023	180 days	7 days	✓	07-Oct-2023	180 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) McBride Creek	E421	28-Sep-2023	05-Oct-2023	180 days	7 days	✓	07-Oct-2023	180 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Nanika River	E421	28-Sep-2023	05-Oct-2023	180 days	7 days	✓	07-Oct-2023	180 days	9 days	✓
Field Tests : Field pH,EC,Salinity,Cl2,CIO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Cutthroat Creek	EF001	28-Sep-2023	----	----	----		06-Oct-2023	----	8 days	
Field Tests : Field pH,EC,Salinity,Cl2,CIO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) McBride Creek	EF001	28-Sep-2023	----	----	----		06-Oct-2023	----	8 days	
Field Tests : Field pH,EC,Salinity,Cl2,CIO2,ORP,DO, Turbidity,T,T-P,o-PO4,NH3,Chloramine										
HDPE - dissolved (lab preserved) Nanika River	EF001	28-Sep-2023	----	----	----		06-Oct-2023	----	8 days	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Cutthroat Creek	E358-L	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	07-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Cutthroat Creek DUP	E358-L	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	07-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) McBride Creek	E358-L	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	07-Oct-2023	28 days	10 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Nanika River	E358-L	28-Sep-2023	07-Oct-2023	28 days	9 days	✓	07-Oct-2023	28 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Cutthroat Creek	E290	28-Sep-2023	30-Sep-2023	14 days	2 days	✓	30-Sep-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Cutthroat Creek DUP	E290	28-Sep-2023	30-Sep-2023	14 days	2 days	✓	30-Sep-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE McBride Creek	E290	28-Sep-2023	30-Sep-2023	14 days	2 days	✓	30-Sep-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Nanika River	E290	28-Sep-2023	30-Sep-2023	14 days	2 days	✓	30-Sep-2023	14 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Cutthroat Creek	E162	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Cutthroat Creek DUP	E162	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE McBride Creek	E162	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Nanika River	E162	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TSS by Gravimetry										
HDPE Cutthroat Creek	E160	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Cutthroat Creek DUP	E160	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE McBride Creek	E160	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Nanika River	E160	28-Sep-2023	----	----	----		04-Oct-2023	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Cutthroat Creek	E121	28-Sep-2023	----	----	----		01-Oct-2023	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Cutthroat Creek DUP	E121	28-Sep-2023	----	----	----		01-Oct-2023	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE McBride Creek	E121	28-Sep-2023	----	----	----		01-Oct-2023	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Nanika River	E121	28-Sep-2023	----	----	----		01-Oct-2023	3 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Cutthroat Creek	E420	28-Sep-2023	04-Oct-2023	180 days	7 days	✓	05-Oct-2023	180 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Cutthroat Creek DUP	E420	28-Sep-2023	04-Oct-2023	180 days	7 days	✓	05-Oct-2023	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) McBride Creek	E420	28-Sep-2023	04-Oct-2023	180 days	7 days	✓	05-Oct-2023	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Nanika River	E420	28-Sep-2023	04-Oct-2023	180 days	7 days	✓	05-Oct-2023	180 days	7 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1162488	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1174287	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1166543	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1174284	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1162492	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1162493	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1169348	1	14	7.1	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	1174288	1	8	12.5	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1166436	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	1174285	1	11	9.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1174286	1	16	6.2	5.0	✔
TSS by Gravimetry	E160	1169376	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1163305	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1162488	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1174287	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1166543	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1174284	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1162492	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1162493	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1169348	1	14	7.1	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	1174288	1	8	12.5	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1166436	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	1174285	1	11	9.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1174286	1	16	6.2	5.0	✔
TSS by Gravimetry	E160	1169376	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1163305	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1162488	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1174287	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1166543	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1174284	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1162492	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1162493	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1169348	1	14	7.1	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Method Blanks (MB) - Continued							
Total Dissolved Nitrogen by Colourimetry	E368	1174288	1	8	12.5	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1166436	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	1174285	1	11	9.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1174286	1	16	6.2	5.0	✔
TSS by Gravimetry	E160	1169376	1	20	5.0	5.0	✔
Turbidity by Nephelometry	E121	1163305	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1174287	1	17	5.8	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1166543	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1174284	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1162492	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1162493	1	20	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	1174288	1	8	12.5	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1166436	1	20	5.0	5.0	✔
Total Nitrogen by Colourimetry	E366	1174285	1	11	9.0	5.0	✔
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1174286	1	16	6.2	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^{\circ}\text{C}$, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^{\circ}\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Dissolved Nitrogen by Colourimetry	E368 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Total Dissolved Nitrogen is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Kjeldahl Nitrogen (Calculation)	EC318 ALS Environmental - Vancouver	Water	BC MOE LABORATORY MANUAL (2005)	Total Kjeldahl Nitrogen is a calculated parameter. Total Kjeldahl Nitrogen (calc) = Total Nitrogen - [Nitrite (as N) + Nitrate (as N)].
Field pH,EC,Salinity,Cl ₂ ,ClO ₂ ,ORP,DO, Turbidity,T,T-P,o-PO ₄ ,NH ₃ ,Chloramine	EF001 ALS Environmental - Vancouver	Water	Field Measurement (Client Supplied)	Field pH,EC,Salinity,Cl ₂ ,ClO ₂ ,ORP,DO, Turbidity,T,T-P,o-PO ₄ ,NH ₃ or Chloramine measurements provided by client and recorded on ALS report may affect the validity of results.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Dissolved Nitrogen in water	EP368 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples are filtration through a 0.45 micron filter and then heated with a persulfate digestion reagent.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .

QUALITY CONTROL REPORT

Work Order	: VA23C3171	Page	: 1 of 18
Client	: Northwest Research and Monitoring Ltd.	Laboratory	: ALS Environmental - Vancouver
Contact	: Laura Guillon	Account Manager	: Sneha Sansare
Address	: PO Box 4357 Smithers BC Canada V0J 2N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: MWMt 2023	Date Samples Received	: 28-Sep-2023 12:30
PO	: ----	Date Analysis Commenced	: 30-Sep-2023
C-O-C number	: 20-1068887	Issue Date	: 13-Oct-2023 13:57
Sampler	: ----		
Site	: ----		
Quote number	: Q72918		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Virginia Smith	Account Manager Assistant	Vancouver Administration, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1162488)											
VA23C3099-003	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	10.7	10.8	0.930%	20%	----
Physical Tests (QC Lot: 1163305)											
VA23C3171-001	Cutthroat Creek	Turbidity	----	E121	0.10	NTU	1.74	1.77	1.71%	15%	----
Physical Tests (QC Lot: 1169348)											
KS2303755-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	253	251	0.793%	20%	----
Physical Tests (QC Lot: 1169376)											
VA23C3108-002	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1162492)											
VA23C3094-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	<0.0250	<0.0250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1162493)											
VA23C3094-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1174285)											
FJ2302592-013	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1174286)											
FJ2302592-013	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1174287)											
FJ2302592-013	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1174288)											
VA23C3171-001	Cutthroat Creek	Nitrogen, total dissolved	----	E368	0.030	mg/L	0.317	0.327	3.07%	20%	----
Organic / Inorganic Carbon (QC Lot: 1174284)											
VA23C3106-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.20	2.07	0.12	Diff <2x LOR	----
Total Metals (QC Lot: 1166436)											
VA23C3103-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0108	0.0104	0.0003	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00074	0.00078	0.00003	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0883	0.0878	0.574%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.037	0.037	0.0004	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000150	mg/L	<0.0000150	<0.0000150	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 1166436) - continued											
VA23C3103-001	Anonymous	Calcium, total	7440-70-2	E420	0.050	mg/L	149	146	1.78%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000012	0.000015	0.000002	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00171	0.00174	0.00003	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.032	0.033	0.001	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0101	0.0101	0.120%	20%	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	47.5	47.5	0.0667%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0184	0.0183	0.556%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0428	0.0432	0.759%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.300	mg/L	<0.300	<0.300	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	12.0	11.8	1.97%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00181	0.00173	0.00008	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000434	0.000484	0.000049	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	13.8	13.9	0.348%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	81.8	80.7	1.35%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	1.15	1.15	0.0328%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	185	184	0.710%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00325	0.00327	0.495%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00185	0.00184	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1166543)											
VA23C3171-001	Cutthroat Creek	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0177	0.0182	2.95%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1166543) - continued											
VA23C3171-001	Cutthroat Creek	Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00028	0.00028	0.000007	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0135	0.0132	2.43%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.91	6.98	0.941%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00012	0.00013	0.000003	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.453	0.444	2.08%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.676	0.665	1.65%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0697	0.0692	0.723%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	0.000052	0.000002	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.212	0.210	0.002	Diff <2x LOR	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00037	0.00035	0.00003	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000065	0.000070	0.000005	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.34	1.34	0.0707%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.922	0.894	3.08%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0265	0.0262	0.972%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.84	0.88	0.04	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1166543) - continued											
VA23C3171-001	Cutthroat Creek	Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1162488)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1163305)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1169348)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1169376)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1162492)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1162493)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1174285)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1174286)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1174287)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1174288)						
Nitrogen, total dissolved	----	E368	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 1174284)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1166436)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1166436) - continued						
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	MBRR
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	MBRR
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	MBRR
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1166543)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1166543) - continued						
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----



Qualifiers

Qualifier	Description
MBRR	Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1162488)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
Physical Tests (QCLot: 1163305)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
Physical Tests (QCLot: 1169348)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Physical Tests (QCLot: 1169376)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	97.8	85.0	115	----
Anions and Nutrients (QCLot: 1162492)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1162493)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1174285)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1174286)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.8	80.0	120	----
Anions and Nutrients (QCLot: 1174287)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	93.0	85.0	115	----
Anions and Nutrients (QCLot: 1174288)									
Nitrogen, total dissolved	----	E368	0.03	mg/L	0.5 mg/L	99.6	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1174284)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 1166436)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	100	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	97.6	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.0	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit					
Total Metals (QCLot: 1166436) - continued									
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.2	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	96.7	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.0	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	# 123	80.0	120	MES
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.3	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	101	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.6	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.4	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	99.3	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.4	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	93.8	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	92.7	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.4	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.8	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.7	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	98.6	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	99.3	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Dissolved Metals (QCLot: 1166543)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.3	80.0	120	----



Sub-Matrix: **Water**

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1166543) - continued									
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.2	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.6	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.6	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.5	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.6	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	99.4	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	112	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.1	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.3	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.5	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	107	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	100	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.0	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	92.0	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.8	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.4	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.5	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.9	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	96.5	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.4	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.7	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1166543) - continued									
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1162492)										
VA23C3128-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1162493)										
VA23C3128-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.535 mg/L	0.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 1174285)										
VA23C3104-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.405 mg/L	0.4 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 1174286)										
KS2303851-012	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0476 mg/L	0.05 mg/L	95.2	70.0	130	----
Anions and Nutrients (QCLot: 1174287)										
KS2303851-012	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0968 mg/L	0.1 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 1174288)										
VA23C3171-002	Nanika River	Nitrogen, total dissolved	----	E368	0.403 mg/L	0.4 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1174284)										
VA23C3104-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.18 mg/L	5 mg/L	104	70.0	130	----
Total Metals (QCLot: 1166436)										
VA23C3103-002	Anonymous	Aluminum, total	7429-90-5	E420	0.181 mg/L	0.2 mg/L	90.7	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00897 mg/L	0.01 mg/L	89.7	70.0	130	----
		Boron, total	7440-42-8	E420	0.092 mg/L	0.1 mg/L	91.9	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Iron, total	7439-89-6	E420	1.95 mg/L	2 mg/L	97.5	70.0	130	----
		Lead, total	7439-92-1	E420	0.0180 mg/L	0.02 mg/L	90.0	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1166436) - continued										
VA23C3103-002	Anonymous	Lithium, total	7439-93-2	E420	0.0925 mg/L	0.1 mg/L	92.5	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00377 mg/L	0.004 mg/L	94.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0169 mg/L	0.02 mg/L	84.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		Zinc, total	7440-66-6	E420	0.373 mg/L	0.4 mg/L	93.2	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
Dissolved Metals (QCLot: 1166543)										
VA23C3171-002	Nanika River	Aluminum, dissolved	7429-90-5	E421	0.201 mg/L	0.2 mg/L	100	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00972 mg/L	0.01 mg/L	97.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.095 mg/L	0.1 mg/L	95.3	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00390 mg/L	0.004 mg/L	97.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00982 mg/L	0.01 mg/L	98.2	70.0	130	----



Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1166543) - continued										
VA23C3171-002	Nanika River	Chromium, dissolved	7440-47-3	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.4	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0949 mg/L	0.1 mg/L	94.9	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	1.07 mg/L	1 mg/L	107	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.34 mg/L	10 mg/L	93.4	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.1	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	10.1 mg/L	10 mg/L	101	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00393 mg/L	0.004 mg/L	98.3	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	2.00 mg/L	2 mg/L	99.8	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.0 mg/L	20 mg/L	100.0	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0377 mg/L	0.04 mg/L	94.2	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0137 mg/L	0.02 mg/L	68.6	70.0	130	MES
		Tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00395 mg/L	0.004 mg/L	98.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0980 mg/L	0.1 mg/L	98.0	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.415 mg/L	0.4 mg/L	104	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).





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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1068887

Page 1 of 1

Report To Contact and company name below will appear on the final report		Reports / Recipients		Turnaround Time (TAT) Requested		AFFIX ALS BARCODE LABEL HERE (ALS use only)																																																																												
Company: Northwest Research and Monitoring Contact: Laura Guillon Phone: 250 877 7858 Company address below will appear on the final report:		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL) Merge QC/QCI Reports with COA <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		<input type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum <input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum <input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests																																																																														
Street: PO Box 4357 City/Province: Smithers BC Postal Code: V0T 2N0		Email 1 or Fax: laura.guillon@nwrm.ca Email 2: info@nwrm.ca Email 3:		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm am/pm																																																																														
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Project Information		Oil and Gas Required Fields (client use)		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																																														
ALS Account # / Quote #: VA 2020NWRM1000001 Job #: MWMT 2023 PO / AFE: LSD:		AFE/Cost Center: Major/Minor Code: Requisitioner: Location:																																																																																
ALS Lab Work Order # (ALS use only):		ALS Contact:		Sampler:																																																																														
ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	<table border="1"> <tr> <th>Total Metals</th> <th>Diss. Metals</th> <th>TN, TEN</th> <th>TDN</th> <th>NO₃ + NO₂</th> <th>NH₃</th> <th>DOC</th> <th>TP</th> <th>TSS</th> <th>Alkalinity</th> <th>Hardness</th> <th>Turbidity</th> <th>TDS</th> </tr> <tr> <td>5</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>												Total Metals	Diss. Metals	TN, TEN	TDN	NO ₃ + NO ₂	NH ₃	DOC	TP	TSS	Alkalinity	Hardness	Turbidity	TDS	5	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Total Metals	Diss. Metals	TN, TEN	TDN	NO ₃ + NO ₂	NH ₃	DOC	TP	TSS	Alkalinity	Hardness	Turbidity	TDS																																																																						
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	Cutthroat Creek	26 Sep 23	11:20	water																																																																														
	Nanika River		11:50																																																																															
	McBride Creek		12:50																																																																															
	Cutthroat Creek Dip.		11:20																																																																															
Drinking Water (DW) Samples (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down (Excel COC only)																																																																																
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		Please add field data to COA and upload to EMS																																																																																
Are samples for human consumption/ use? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO																																																																																		
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEIPT																																																																																
Released by: Laura		Date: 27 Sep 23		Time: 12:00		Received by:																																																																												
						Date:																																																																												



Field Crew

Date

DN/C5
Sept 27, 2023

_ of _ pages

Water Quality Sampling Field Card					
Site	Time	EMS ID	Water Stage	Water Colour	Ice Cover (cm)
Cutthroat Creek	11:20	272556	L/M/H	light tea	N/A
Sp. Cond. (uS/cm)	52.9	DO (mg/L)	7.1	Duplicate	Q/N
Cond (mmHg)	/	pH	7.01	Field Blank	Y/N
DO (%)	60%	Water Temp (°C)	8.4	# Sample Bottles	10 total
Notes: water stage(H), stream bed blanketed Temp logger taken out 1135am. SN: 21764084 - Delayed start 12pm					

Water Quality Sampling Field Card					
Site	Time	EMS ID	Water Stage	Water Colour	Ice Cover (cm)
Nanika River	11:50	272557	L/M/H	clear	N/A
Sp. Cond. (uS/cm)	57.9	DO (mg/L)	10.2	Duplicate	Y/N
Cond (mmHg)	/	pH	7.80	Field Blank	Y/N
DO (%)	90%	Water Temp (°C)	10°	# Sample Bottles	total: 5
Notes: KPa: 91.9; 11:58am temp logger taken out. SN 21764076 Delayed start 1pm					

Water Quality Sampling Field Card					
Site	Time	EMS ID	Water Stage	Water Colour	Ice Cover (cm)
Mcbride	12:50	260496	L/M/H	clear	N/A
Sp. Cond. (uS/cm)	49.4	DO (mg/L)	8.4	Duplicate	Y/N
Cond (mmHg)	/	pH	6.95	Field Blank	Y/N
DO (%)	68	Water Temp (°C)	6.8°	# Sample Bottles	5
Notes: KPa: 92.4 SN 21764086 - temp logger out of water stream dry. Stagnant water extract data @ 1:11pm - delay start 2pm					