



# CERTIFICATE OF ANALYSIS

Work Order	: VA20B4032
Client	: Northwest Research and Monitoring Ltd.
Contact	: Laura Guillon
Address	: PO Box 4357 Smithers BC Canada V0J 2N0
Telephone	: ----
Project	: MWMT 5 in 30 2020
PO	: ----
C-O-C number	: 17-840072
Sampler	: ----
Site	: ----
Quote number	: Q72918
No. of samples received	: 6
No. of samples analysed	: 6

Page	: 1 of 8
Laboratory	: Vancouver - Environmental
Account Manager	: Rojina Ghavami
Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: +1 604 253 4188
Date Samples Received	: 31-Aug-2020 13:10
Date Analysis Commenced	: 01-Sep-2020
Issue Date	: 09-Sep-2020 15:48

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
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Ann Ho	Laboratory Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Janice Pearson	Account Manager Assistant	Administration, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, 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 Unit
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 in reports identified as "Preliminary Report" are considered authorized for use.

## Qualifiers

Qualifier	Description
RRV	Reported result verified by repeat analysis.



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Shea Creek	Shea Creek Duplicate	Gosnel Creek	Crystal Creek	Field Blank
Client sampling date / time					27-Aug-2020 11:30	27-Aug-2020 11:30	27-Aug-2020 12:00	27-Aug-2020 12:30	27-Aug-2020 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-001	VA20B4032-002	VA20B4032-003	VA20B4032-004	VA20B4032-005	
					Result	Result	Result	Result	Result	
Field Tests										
conductivity, field	----	EF001	0.1	µS/cm	51.0	----	76.6	77.8	----	
pH, field	----	EF001	0.100	pH units	7.82	----	7.76	7.80	----	
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	25.2	25.4	35.5	31.7	<1.0	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	22.5	22.6	35.3	32.9	<0.60	
solids, total dissolved [TDS]	----	E162	10	mg/L	40	40	54	57	<10	
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	
turbidity	----	E121	0.10	NTU	0.27	0.28	0.46	0.39	<0.10	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050 <sup>RRV</sup>	0.0184 <sup>RRV</sup>	0.0162	0.0056	<0.0050	
Kjeldahl nitrogen, total [TKN]	----	EC318	0.050	mg/L	0.064	0.081	0.062	<0.050	<0.050	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.066	0.083	0.064	0.031	<0.030	
nitrogen, total dissolved	----	E368	0.030	mg/L	0.101	0.086	0.077	0.078	<0.030	
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0024	0.0022	0.0022	0.0030	<0.0020	
Organic / Inorganic Carbon										
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.54	2.28	1.71	1.50	<0.50	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0129	0.0137	0.0508	0.0373	<0.0030	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00018	0.00018	0.00020	0.00021	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0277	0.0269	0.0189	0.00458	<0.00010	
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	7.09	7.22	11.8	11.8	<0.050	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Shea Creek	Shea Creek Duplicate	Gosnel Creek	Crystal Creek	Field Blank
Client sampling date / time					27-Aug-2020 11:30	27-Aug-2020 11:30	27-Aug-2020 12:00	27-Aug-2020 12:30	27-Aug-2020 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-001	VA20B4032-002	VA20B4032-003	VA20B4032-004	VA20B4032-005	
					Result	Result	Result	Result	Result	
Total Metals										
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00059	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	0.073	0.077	0.145	0.029	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000066	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	1.12	1.16	1.40	0.925	<0.0050	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00536	0.00557	0.00938	0.00165	<0.00010	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0.000274	0.000936	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.129	0.135	0.162	0.219	<0.050	
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.00031	<0.00020	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0.000060	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	2.65	2.64	3.10	2.78	<0.10	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	7440-23-5	E420	0.050	mg/L	1.14	1.22	1.48	1.59	<0.050	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.0303	0.0291	0.0409	0.0326	<0.00020	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	1.42	2.08	<0.50	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0.00150	0.00095	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0.000012	0.000035	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0.00058	0.00058	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0060	0.0068	0.0063	0.0080	<0.0010	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Shea Creek	Shea Creek Duplicate	Gosnel Creek	Crystal Creek	Field Blank
Client sampling date / time					27-Aug-2020 11:30	27-Aug-2020 11:30	27-Aug-2020 12:00	27-Aug-2020 12:30	27-Aug-2020 12:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-001	VA20B4032-002	VA20B4032-003	VA20B4032-004	VA20B4032-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00015	0.00013	0.00017	<0.00010	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0272	0.0281	0.0186	0.00419	<0.00010	
beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	7.35	7.31	12.1	11.8	<0.050	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00028	0.00038	0.00033	0.00049	<0.00020	
iron, dissolved	7439-89-6	E421	0.010	mg/L	0.040	0.044	0.059	<0.010	<0.010	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.02	1.06	1.25	0.829	<0.0050	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00398	0.00434	0.00450	0.00077	<0.00010	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000081	0.000064	0.000283	0.000950	<0.000050	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.108	0.120	0.138	0.180	<0.050	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.00029	<0.00020	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.39	2.58	2.97	2.72	0.093 <sup>RRV</sup>	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.02	1.09	1.34	1.40	<0.050	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0316	0.0307	0.0426	0.0324	<0.00020	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	1.09	1.59	<0.50	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	



## Analytical Results

Sub-Matrix: Water

(Matrix: Water)

					Client sample ID	Shea Creek	Shea Creek Duplicate	Gosnel Creek	Crystal Creek	Field Blank
Client sampling date / time						27-Aug-2020 11:30	27-Aug-2020 11:30	27-Aug-2020 12:00	27-Aug-2020 12:30	27-Aug-2020 12:00
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-001	VA20B4032-002	VA20B4032-003	VA20B4032-004	VA20B4032-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0.000010	0.000035	<0.000010	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	Field

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



## Analytical Results

Sub-Matrix: Water			Client sample ID		Travel Blank	----	----	----	----
(Matrix: Water)									
Client sampling date / time					27-Aug-2020	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-006	-----	-----	-----	-----
					Result	---	---	---	---
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	----	----	----	----
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----	----	----	----
solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	----	----	----	----
turbidity	----	E121	0.10	NTU	<0.10	----	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0089 <sup>RRV</sup>	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	EC318	0.050	mg/L	<0.050	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	----	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	----	----	----	----
nitrogen, total dissolved	----	E368	0.030	mg/L	<0.030	----	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	----	----	----	----
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	----	----	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	----	----	----	----
beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	----	----	----	----



## Analytical Results

Sub-Matrix: Water

Client sample ID

(Matrix: Water)

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Travel Blank	----	----	----	----
Client sampling date / time					27-Aug-2020	---	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA20B4032-006	-----	-----	-----	-----	
					Result	---	---	---	---	
Total Metals										
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	----	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	----	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	----	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	----	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	----	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	----	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	----	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	----	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	----	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	----	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	----	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	----	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	----	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----	

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



## QUALITY CONTROL INTERPRETIVE REPORT

**Work Order : VA20B4032**

**Client : Northwest Research and Monitoring Ltd.**

**Contact : Laura Guillon**

**Address : PO Box 4357  
Smithers BC Canada V0J 2N0**

**Telephone : ----**

**Project : MWMT 5 in 30 2020**

**PO : ----**

**C-O-C number : 17-840072**

**Sampler : ----**

**Site : ----**

**Quote number : Q72918**

**No. of samples received : 6**

**No. of samples analysed : 6**

**Page : 1 of 18**

**Laboratory : Vancouver - Environmental**

**Account Manager : Rojina Ghavami**

**Address : 8081 Lougheed Highway  
Burnaby, British Columbia Canada V5A 1W9**

**Telephone : +1 604 253 4188**

**Date Samples Received : 31-Aug-2020 13:10**

**Issue Date : 09-Sep-2020 15:48**

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 Services number is a unique identifier assigned to discrete substances.

**DQO:** Data Quality Objective.

**LOR:** Limit of Reporting (detection limit).

**RPD:** Relative Percent Difference.

## Summary of Outliers

### Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value 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)

- Analysis Holding Time Outliers exist - please see following pages for full details.

### 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
<b>Method Blank (MB) Values</b>								
Total Metals	QC-MRG2-8063000 1	----	manganese, total	7439-96-5	E420	0.00053 <sup>B</sup> mg/L	0.0001 mg/L	Blank result exceeds permitted value
Total Metals	QC-MRG2-8063000 1	----	molybdenum, total	7439-98-7	E420	0.000060 <sup>B</sup> mg/L	0.00005 mg/L	Blank result exceeds permitted value

## Result Qualifiers

Qualifier	Description
<b>B</b>	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



## 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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	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) Crystal Creek	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Gosnel Creek	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Shea Creek	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Shea Creek Duplicate	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Travel Blank	E298	27-Aug-2020	----	----	----		05-Sep-2020	28 days	8 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Crystal Creek	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR



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 : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Field Blank	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Gosnel Creek	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Shea Creek	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Shea Creek Duplicate	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Travel Blank	E378-U	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Crystal Creek	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Gosnel Creek	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Shea Creek	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>



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 Shea Creek Duplicate	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Crystal Creek	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Gosnel Creek	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Shea Creek	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Shea Creek Duplicate	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	<div>✖ EHTR</div>
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Crystal Creek	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✔	04-Sep-2020	20 days	0 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	
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Field Blank	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Gosnel Creek	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Shea Creek	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Shea Creek Duplicate	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Dissolved Nitrogen by Colourimetry										
Amber glass dissolved (sulfuric acid) Travel Blank	E368	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Crystal Creek	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Gosnel Creek	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Shea Creek	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 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) Shea Creek Duplicate	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Travel Blank	E366	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Crystal Creek	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Field Blank	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Gosnel Creek	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Shea Creek	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Shea Creek Duplicate	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (Ultra Trace)										
Amber glass total (sulfuric acid) Travel Blank	E372-U	27-Aug-2020	03-Sep-2020	28 days	7 days	✓	04-Sep-2020	20 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Crystal Creek	E421	27-Aug-2020	02-Sep-2020	180 days	5 days	✓	02-Sep-2020	174 days	0 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	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Gosnel Creek	E421	27-Aug-2020	02-Sep-2020	180 days	5 days	✓	02-Sep-2020	174 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Shea Creek	E421	27-Aug-2020	02-Sep-2020	180 days	6 days	✓	02-Sep-2020	173 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Shea Creek Duplicate	E421	27-Aug-2020	02-Sep-2020	180 days	6 days	✓	02-Sep-2020	173 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Field Blank	E421	27-Aug-2020	02-Sep-2020	180 days	7 days	✓	02-Sep-2020	172 days	-1 days	✓
Field Tests : Field pH, EC, Salinity, Cl2, ORP, DO, Turbidity or T										
HDPE Crystal Creek	EF001	27-Aug-2020	----	----	----		01-Sep-2020	----	----	
Field Tests : Field pH, EC, Salinity, Cl2, ORP, DO, Turbidity or T										
HDPE Gosnel Creek	EF001	27-Aug-2020	----	----	----		01-Sep-2020	----	----	
Field Tests : Field pH, EC, Salinity, Cl2, ORP, DO, Turbidity or T										
HDPE Shea Creek	EF001	27-Aug-2020	----	----	----		01-Sep-2020	----	----	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Crystal Creek	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Field Blank	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 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	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Gosnel Creek	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Shea Creek	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Shea Creek Duplicate	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Travel Blank	E358-L	27-Aug-2020	----	----	----		03-Sep-2020	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Crystal Creek	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Gosnel Creek	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Shea Creek	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	5 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 : Alkalinity Species by Titration										
HDPE Shea Creek Duplicate	E290	27-Aug-2020	----	----	----		01-Sep-2020	14 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Crystal Creek	E162	27-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Field Blank	E162	27-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Gosnel Creek	E162	27-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Shea Creek	E162	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Shea Creek Duplicate	E162	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Travel Blank	E162	27-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Crystal Creek	E160-H	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Field Blank	E160-H	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 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 Gosnel Creek	E160-H	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Shea Creek	E160-H	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Shea Creek Duplicate	E160-H	27-Aug-2020	----	----	----		02-Sep-2020	7 days	6 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160-H	27-Aug-2020	----	----	----		03-Sep-2020	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Crystal Creek	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Field Blank	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Gosnel Creek	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Shea Creek	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR
Physical Tests : Turbidity by Nephelometry										
HDPE Shea Creek Duplicate	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR



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 : Turbidity by Nephelometry										
HDPE Travel Blank	E121	27-Aug-2020	----	----	----		01-Sep-2020	3 days	4 days	✖ EHTR
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Crystal Creek	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Field Blank	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Gosnel Creek	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Shea Creek	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Shea Creek Duplicate	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	27-Aug-2020	----	----	----		03-Sep-2020	180 days	7 days	✔

**Legend & Qualifier Definitions**

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	79566	2	35	5.7	5.0	✔
Ammonia by Fluorescence	E298	80862	1	14	7.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	80289	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	80859	1	6	16.6	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	79558	2	35	5.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79562	2	35	5.7	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79563	2	35	5.7	5.0	✔
TDS by Gravimetry	E162	80769	4	80	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	80863	1	6	16.6	5.0	✔
Total Metals in Water by CRC ICPMS	E420	79922	2	31	6.4	5.0	✔
Total Nitrogen by Colourimetry	E366	80860	1	6	16.6	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	80861	1	6	16.6	5.0	✔
TSS by Gravimetry	E160-H	80786	2	40	5.0	5.0	✔
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	79566	2	35	5.7	5.0	✔
Ammonia by Fluorescence	E298	80862	1	14	7.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	80289	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	80859	1	6	16.6	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	79558	2	35	5.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79562	2	35	5.7	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79563	2	35	5.7	5.0	✔
TDS by Gravimetry	E162	80769	4	80	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	80863	1	6	16.6	5.0	✔
Total Metals in Water by CRC ICPMS	E420	79922	2	31	6.4	5.0	✔
Total Nitrogen by Colourimetry	E366	80860	1	6	16.6	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	80861	1	6	16.6	5.0	✔
TSS by Gravimetry	E160-H	80786	2	40	5.0	5.0	✔
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✔
Method Blanks (MB)							
Alkalinity Species by Titration	E290	79566	2	35	5.7	5.0	✔
Ammonia by Fluorescence	E298	80862	1	14	7.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	80289	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	80859	1	6	16.6	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	79558	2	35	5.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79562	2	35	5.7	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79563	2	35	5.7	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							
TDS by Gravimetry	E162	80769	4	80	5.0	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	80863	1	6	16.6	5.0	✔
Total Metals in Water by CRC ICPMS	E420	79922	3	31	9.6	5.0	✔
Total Nitrogen by Colourimetry	E366	80860	1	6	16.6	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	80861	1	6	16.6	5.0	✔
TSS by Gravimetry	E160-H	80786	2	40	5.0	5.0	✔
Turbidity by Nephelometry	E121	79729	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	80862	1	14	7.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	80289	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	80859	1	6	16.6	5.0	✔
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	79558	2	35	5.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	79562	2	35	5.7	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	79563	2	35	5.7	5.0	✔
Total Dissolved Nitrogen by Colourimetry	E368	80863	1	6	16.6	5.0	✔
Total Metals in Water by CRC ICPMS	E420	79922	2	31	6.4	5.0	✔
Total Nitrogen by Colourimetry	E366	80860	1	6	16.6	5.0	✔
Total Phosphorus by Colourimetry (Ultra Trace)	E372-U	80861	1	6	16.6	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  Vancouver - Environmental	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-H  Vancouver - Environmental	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  Vancouver - Environmental	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  Vancouver - Environmental	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  Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290  Vancouver - Environmental	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  Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L  Vancouver - Environmental	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 <sub>2</sub> . 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  Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Dissolved Nitrogen by Colourimetry	E368  Vancouver - Environmental	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 (Ultra Trace)	E372-U  Vancouver - Environmental	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U  Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420  Vancouver - Environmental	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  Vancouver - Environmental	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  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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.
Hardness (Calculated) from Total Ca/Mg	EC100A  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> 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. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Total Kjeldahl Nitrogen (Calculation)	EC318  Vancouver - Environmental	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 <sub>2</sub> , ORP, DO, Turbidity or T	EF001  Vancouver - Environmental	Water	Field Measurement (Client Supplied)	Field pH, EC, Salinity, Cl <sub>2</sub> , ORP, DO, Turbidity or T measurements provided by client and recorded on ALS report may affect the validity of results.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Total Nitrogen in water	EP366	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	Vancouver - Environmental			
Digestion for Total Dissolved Nitrogen in water	EP368 Vancouver - Environmental	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 Vancouver - Environmental	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.



## QUALITY CONTROL REPORT

Work Order : **VA20B4032**

Page : 1 of 22

Client : Northwest Research and Monitoring Ltd.  
Contact : Laura Guillon  
Address : PO Box 4357  
Smithers BC Canada V0J 2N0  
Telephone : ----  
Project : MWM 5 in 30 2020  
PO : ----  
C-O-C number : 17-840072  
Sampler : ----  
Site : ----  
Quote number : Q72918  
No. of samples received : 6  
No. of samples analysed : 6

Laboratory : Vancouver - Environmental  
Account Manager : Rojina Ghavami  
Address : 8081 Lougheed Highway  
Burnaby, British Columbia Canada V5A 1W9  
Telephone : +1 604 253 4188  
Date Samples Received : 31-Aug-2020 13:10  
Date Analysis Commenced : 01-Sep-2020  
Issue Date : 09-Sep-2020 15:48

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### 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
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Ann Ho	Laboratory Analyst	Metals, Burnaby, British Columbia
Bruna Botti	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Caitlin Macey	Team Leader - Inorganics	Inorganics - Water Quality, Burnaby, British Columbia
Janice Pearson	Account Manager Assistant	Administration, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics - Water Quality, Burnaby, British Columbia
Omar Beydoun	Lab Assistant	Metals, Burnaby, British Columbia

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Work Order : VA20B4032  
Client : Northwest Research and Monitoring Ltd.  
Project : MWMT 5 in 30 2020



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## 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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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



## 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: <b>Water</b>					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
<b>Physical Tests (QC Lot: 79566)</b>											
VA20B3995-003	Anonymous	alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	207	213	2.90%	20%	----
<b>Physical Tests (QC Lot: 79574)</b>											
VA20B4041-001	Anonymous	alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	14.8	14.7	0.678%	20%	----
<b>Physical Tests (QC Lot: 79729)</b>											
VA20B3887-001	Anonymous	turbidity	----	E121	0.10	NTU	726	767	5.49%	15%	----
<b>Physical Tests (QC Lot: 80769)</b>											
VA20B4002-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	278	288	3.54%	20%	----
<b>Physical Tests (QC Lot: 80770)</b>											
VA20B4067-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	209	185	24	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 80786)</b>											
VA20B3988-006	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	<3.0	<3.0	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 80941)</b>											
VA20B3987-009	Anonymous	solids, total dissolved [TDS]	----	E162	13	mg/L	177	193	8.63%	20%	----
<b>Physical Tests (QC Lot: 81124)</b>											
KS2001589-001	Anonymous	solids, total suspended [TSS]	----	E160-H	3.0	mg/L	55.2	62.0	11.6%	20%	----
<b>Physical Tests (QC Lot: 81128)</b>											
VA20B3995-004	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	877	989	12.0%	20%	----
<b>Anions and Nutrients (QC Lot: 79558)</b>											
VA20B3995-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79562)</b>											
VA20B3995-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.274	0.275	0.505%	20%	----
<b>Anions and Nutrients (QC Lot: 79563)</b>											
VA20B3995-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79568)</b>											
VA20B4041-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0552	0.0551	0.188%	20%	----
<b>Anions and Nutrients (QC Lot: 79569)</b>											
VA20B4041-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 79577)</b>											
VA20B4032-003	Gosnel Creek	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80860)</b>											
VA20B4032-001	Shea Creek	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.066	0.066	0.0003	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
<b>Anions and Nutrients (QC Lot: 80861)</b>											
VA20B4032-001	Shea Creek	phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0024	0.0024	0.00005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80862)</b>											
VA20B4032-001	Shea Creek	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 80863)</b>											
VA20B4032-001	Shea Creek	nitrogen, total dissolved	----	E368	0.030	mg/L	0.101	0.132	0.031	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 80859)</b>											
VA20B4032-001	Shea Creek	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.54	2.36	0.18	Diff <2x LOR	----
<b>Total Metals (QC Lot: 79922)</b>											
VA20B4006-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	2.29	2.22	3.10%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00040	0.00038	0.00002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00476	0.00470	1.32%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0550	0.0545	0.917%	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	0.000065	0.000064	0.0000007	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000267	0.000260	2.76%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	11.7	11.6	0.420%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000270	0.000262	2.99%	20%	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00282	0.00276	0.00006	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00173	0.00174	0.536%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00990	0.00989	0.0425%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	3.18	3.19	0.175%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00663	0.00668	0.624%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0017	0.0017	0.00004	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.74	1.69	2.94%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.117	0.115	1.87%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00161	0.00159	1.22%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00280	0.00289	0.00009	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.141	0.141	0.0003	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	0.990	0.972	1.82%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00302	0.00288	4.57%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000717	0.000781	8.51%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	3.92	3.94	0.595%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000056	0.000058	0.000002	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	0.503	0.486	0.018	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: 79922) - continued											
VA20B4006-001	Anonymous	strontium, total	7440-24-6	E420	0.00020	mg/L	0.0675	0.0655	2.90%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	2.57	2.78	0.21	Diff <2x LOR	----
		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	0.000026	0.000026	0.00000007	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00026	0.00028	0.00002	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	0.00030	mg/L	0.0913	0.0880	3.64%	20%	----
		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	0.000286	0.000292	2.15%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00805	0.00779	3.25%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0264	0.0254	0.0010	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 80630)											
VA20B3861-003	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	2.10	2.12	1.26%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00010	0.00011	0.000009	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00100	0.00095	0.00005	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0338	0.0328	3.18%	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	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000337	0.0000342	0.0000006	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	17.8	17.5	1.52%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000140	0.000144	2.51%	20%	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00344	0.00335	0.00010	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00134	0.00132	1.22%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00424	0.00422	0.00002	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	2.42	2.53	4.52%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000840	0.000848	0.962%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0028	0.0027	0.0001	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	4.50	4.47	0.754%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0649	0.0636	2.08%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000747	0.000704	5.87%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00486	0.00483	0.00003	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.085	0.110	0.025	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	1.19	1.27	6.48%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00297	0.00291	1.99%	20%	----



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: 80630) - continued											
VA20B3861-003	Anonymous	selenium, total	7782-49-2	E420	0.000050	mg/L	0.000142	0.000111	0.000031	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	6.60	6.18	6.67%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000014	0.000012	0.000002	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	4.14	4.26	2.86%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0932	0.0931	0.109%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	3.04	2.88	0.16	Diff <2x LOR	----
		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	0.000017	0.000017	0.0000004	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00031	0.00034	0.00003	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	0.00030	mg/L	0.0981	0.0966	1.53%	20%	----
		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	0.000292	0.000348	17.6%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00506	0.00514	1.65%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0064	0.0076	0.0012	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00180	mg/L	<0.00180	<0.00180	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 80289)											
VA20B4006-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0742	0.0743	0.0894%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00022	0.00022	0.0000007	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00088	0.00087	0.000001	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0131	0.0135	3.08%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	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	0.0000420	0.0000362	0.0000058	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	11.3	11.0	2.67%	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	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00043	0.00038	0.00004	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.051	0.051	0.0002	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000132	0.000132	0.0000009	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	0.581	0.566	2.57%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00983	0.0101	2.95%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00158	0.00161	1.52%	20%	----





Sub-Matrix: <b>Water</b>					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
<b>Dissolved Metals (QC Lot: 80289) - continued</b>											
VA20B4006-001	Anonymous	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	0.361	0.354	0.008	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00049	0.00044	0.00004	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000539	0.000594	9.65%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.714	0.678	5.18%	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	0.304	0.291	0.013	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0624	0.0625	0.0932%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	2.18	2.48	0.29	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	0.00168	0.00187	0.00019	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	0.000184	0.000186	0.729%	20%	----
		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	0.0011	0.0010	0.00007	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	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
<b>Physical Tests (QCLot: 79566)</b>						
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79574)</b>						
alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1	mg/L	<1.0	----
<b>Physical Tests (QCLot: 79729)</b>						
turbidity	----	E121	0.1	NTU	<0.10	----
<b>Physical Tests (QCLot: 80769)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 80770)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 80786)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 80941)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Physical Tests (QCLot: 81124)</b>						
solids, total suspended [TSS]	----	E160-H	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 81128)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 79558)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79562)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79563)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79568)</b>						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 79569)</b>						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 79577)</b>						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 80860)</b>						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
<b>Anions and Nutrients (QCLot: 80861)</b>						
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 80862)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 80863)</b>						
nitrogen, total dissolved	----	E368	0.03	mg/L	<0.030	----
<b>Organic / Inorganic Carbon (QCLot: 80859)</b>						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
<b>Total Metals (QCLot: 79922)</b>						
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	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
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	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 79922) - continued</b>						
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	----
<b>Total Metals (QCLot: 80630)</b>						
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	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
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	# 0.00053	B
molybdenum, total	7439-98-7	E420	0.00005	mg/L	# 0.000060	B
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 80630) - continued</b>						
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	----
<b>Dissolved Metals (QCLot: 80289)</b>						
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	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 80289) - continued						
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
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

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

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 79566)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.8	85.0	115	----
Physical Tests (QCLot: 79574)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 79729)									
turbidity	----	E121	0.1	NTU	200 NTU	100	85.0	115	----
Physical Tests (QCLot: 80769)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
Physical Tests (QCLot: 80770)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
Physical Tests (QCLot: 80786)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	96.7	85.0	115	----
Physical Tests (QCLot: 80941)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Physical Tests (QCLot: 81124)									
solids, total suspended [TSS]	----	E160-H	3	mg/L	150 mg/L	97.7	85.0	115	----
Physical Tests (QCLot: 81128)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 79558)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	96.1	80.0	120	----
Anions and Nutrients (QCLot: 79562)									
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: 79563)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 79568)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 79569)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.8	90.0	110	----
Anions and Nutrients (QCLot: 79577)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.9	80.0	120	----
Anions and Nutrients (QCLot: 80860)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	97.3	75.0	125	----
Anions and Nutrients (QCLot: 80861)									



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 80861) - continued</b>									
phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.8	80.0	120	----
<b>Anions and Nutrients (QCLot: 80862)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	98.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 80863)</b>									
nitrogen, total dissolved	----	E368	0.03	mg/L	0.5 mg/L	96.9	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 80859)</b>									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
<b>Total Metals (QCLot: 79922)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	97.7	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.8	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	99.8	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.9	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.9	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.2	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.3	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	104	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	96.9	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	102	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
Total Metals (QCLot: 79922) - continued									
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	93.2	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.9	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.1	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.8	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	101	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	96.3	80.0	120	----
Total Metals (QCLot: 80630)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	112	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	118	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	114	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	107	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	113	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	108	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	109	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	110	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	111	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	110	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	106	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	116	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	111	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	109	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	111	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	103	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	112	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	112	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
<b>Total Metals (QCLot: 80630) - continued</b>									
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	112	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	111	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	111	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	110	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	102	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	107	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	108	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	112	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	111	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
<b>Dissolved Metals (QCLot: 80289)</b>									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	92.8	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.2	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	92.3	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.3	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	110	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.2	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.7	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	92.2	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	91.2	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	90.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	84.8	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	98.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	89.9	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	91.3	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	91.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.3	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 80289) - continued</b>									
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	89.0	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	93.8	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.1	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	92.3	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	82.3	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	86.7	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	92.2	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.7	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	96.7	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
<b>Anions and Nutrients (QCLot: 79558)</b>										
VA20B3995-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0298 mg/L	0.03 mg/L	99.4	70.0	130	----
<b>Anions and Nutrients (QCLot: 79562)</b>										
VA20B3995-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	11.6 mg/L	12.5 mg/L	92.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 79563)</b>										
VA20B3995-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.29 mg/L	2.5 mg/L	91.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 79568)</b>										
VA20B4041-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.46 mg/L	2.5 mg/L	98.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 79569)</b>										
VA20B4041-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.483 mg/L	0.5 mg/L	96.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 79577)</b>										
VA20B4032-004	Crystal Creek	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0310 mg/L	0.03 mg/L	103	70.0	130	----
<b>Anions and Nutrients (QCLot: 80860)</b>										
VA20B4032-002	Shea Creek Duplicate	nitrogen, total	7727-37-9	E366	0.375 mg/L	0.4 mg/L	93.7	70.0	130	----
<b>Anions and Nutrients (QCLot: 80861)</b>										
VA20B4032-002	Shea Creek Duplicate	phosphorus, total	7723-14-0	E372-U	0.0510 mg/L	0.05 mg/L	102	70.0	130	----
<b>Anions and Nutrients (QCLot: 80862)</b>										
VA20B4032-002	Shea Creek Duplicate	ammonia, total (as N)	7664-41-7	E298	0.230 mg/L	0.2 mg/L	115	75.0	125	----
<b>Anions and Nutrients (QCLot: 80863)</b>										
VA20B4032-002	Shea Creek Duplicate	nitrogen, total dissolved	----	E368	0.381 mg/L	0.4 mg/L	95.3	70.0	130	----
<b>Organic / Inorganic Carbon (QCLot: 80859)</b>										
VA20B4032-002	Shea Creek Duplicate	carbon, dissolved organic [DOC]	----	E358-L	5.40 mg/L	5 mg/L	108	70.0	130	----
<b>Total Metals (QCLot: 79922)</b>										
VA20B4006-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0197 mg/L	0.02 mg/L	98.7	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	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00990 mg/L	0.01 mg/L	99.0	70.0	130	----



Sub-Matrix: **Water**

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: 79922) - continued										
VA20B4006-002	Anonymous	boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	92.6	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00401 mg/L	0.004 mg/L	100	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	0.00983 mg/L	0.01 mg/L	98.3	70.0	130	----
		chromium, total	7440-47-3	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		lithium, total	7439-93-2	E420	0.0914 mg/L	0.1 mg/L	91.4	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	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		nickel, total	7440-02-0	E420	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.81 mg/L	10 mg/L	98.1	70.0	130	----
		potassium, total	7440-09-7	E420	4.11 mg/L	4 mg/L	103	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		selenium, total	7782-49-2	E420	0.0396 mg/L	0.04 mg/L	98.9	70.0	130	----
		silver, total	7440-22-4	E420	0.00381 mg/L	0.004 mg/L	95.3	70.0	130	----
		sodium, total	7440-23-5	E420	2.32 mg/L	2 mg/L	116	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	19.8 mg/L	20 mg/L	99.2	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0370 mg/L	0.04 mg/L	92.4	70.0	130	----
		thallium, total	7440-28-0	E420	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		thorium, total	7440-29-1	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		tin, total	7440-31-5	E420	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		zinc, total	7440-66-6	E420	0.395 mg/L	0.4 mg/L	98.8	70.0	130	----
Total Metals (QCLot: 80630)										
VA20B4004-001	Anonymous	aluminum, total	7429-90-5	E420	110 mg/L	100 mg/L	110	70.0	130	----
		antimony, total	7440-36-0	E420	10.6 mg/L	10 mg/L	106	70.0	130	----
		arsenic, total	7440-38-2	E420	10.8 mg/L	10 mg/L	108	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	21.5 mg/L	20 mg/L	108	70.0	130	----



Sub-Matrix: **Water**

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: 80630) - continued										
VA20B4004-001	Anonymous	bismuth, total	7440-69-9	E420	4.84 mg/L	5 mg/L	96.7	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	50 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	2.09 mg/L	2 mg/L	105	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	2000 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	5.42 mg/L	5 mg/L	108	70.0	130	----
		chromium, total	7440-47-3	E420	22.0 mg/L	20 mg/L	110	70.0	130	----
		cobalt, total	7440-48-4	E420	10.5 mg/L	10 mg/L	105	70.0	130	----
		copper, total	7440-50-8	E420	10.5 mg/L	10 mg/L	105	70.0	130	----
		iron, total	7439-89-6	E420	1040 mg/L	1000 mg/L	104	70.0	130	----
		lead, total	7439-92-1	E420	9.76 mg/L	10 mg/L	97.6	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	50 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	525 mg/L	500 mg/L	105	70.0	130	----
		manganese, total	7439-96-5	E420	10.3 mg/L	10 mg/L	103	70.0	130	----
		molybdenum, total	7439-98-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		nickel, total	7440-02-0	E420	21.1 mg/L	20 mg/L	106	70.0	130	----
		phosphorus, total	7723-14-0	E420	5820 mg/L	5000 mg/L	116	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	2000 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	10.9 mg/L	10 mg/L	109	70.0	130	----
		selenium, total	7782-49-2	E420	21.9 mg/L	20 mg/L	110	70.0	130	----
		silicon, total	7440-21-3	E420	4900 mg/L	5000 mg/L	98.1	70.0	130	----
		silver, total	7440-22-4	E420	2.03 mg/L	2 mg/L	101	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	1000 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	11200 mg/L	10000 mg/L	112	70.0	130	----
		tellurium, total	13494-80-9	E420	19.5 mg/L	20 mg/L	97.5	70.0	130	----
		thallium, total	7440-28-0	E420	1.95 mg/L	2 mg/L	97.5	70.0	130	----
		thorium, total	7440-29-1	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		tin, total	7440-31-5	E420	10.3 mg/L	10 mg/L	103	70.0	130	----
		titanium, total	7440-32-6	E420	22.1 mg/L	20 mg/L	111	70.0	130	----
		tungsten, total	7440-33-7	E420	10.0 mg/L	10 mg/L	100	70.0	130	----
		uranium, total	7440-61-1	E420	2.03 mg/L	2 mg/L	101	70.0	130	----
		vanadium, total	7440-62-2	E420	56.2 mg/L	50 mg/L	112	70.0	130	----
		zinc, total	7440-66-6	E420	201 mg/L	200 mg/L	101	70.0	130	----
		zirconium, total	7440-67-7	E420	21.2 mg/L	20 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 80289)										
VA20B4006-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.187 mg/L	0.2 mg/L	93.6	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
<b>Dissolved Metals (QCLot: 80289) - continued</b>										
VA20B4006-002	Anonymous	antimony, dissolved	7440-36-0	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.095 mg/L	0.1 mg/L	94.9	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00401 mg/L	0.004 mg/L	100	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	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	93.0	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.81 mg/L	2 mg/L	90.5	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0976 mg/L	0.1 mg/L	97.6	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.905 mg/L	1 mg/L	90.5	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.54 mg/L	10 mg/L	95.4	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.61 mg/L	4 mg/L	90.2	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0191 mg/L	0.02 mg/L	95.5	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.54 mg/L	10 mg/L	95.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00377 mg/L	0.004 mg/L	94.4	70.0	130	----
		sodium, dissolved	7440-23-5	E421	2.03 mg/L	2 mg/L	102	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	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00397 mg/L	0.004 mg/L	99.2	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0250 mg/L	0.02 mg/L	125	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0362 mg/L	0.04 mg/L	90.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00421 mg/L	0.004 mg/L	105	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0953 mg/L	0.1 mg/L	95.3	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.393 mg/L	0.4 mg/L	98.4	70.0	130	----



Sub-Matrix: **Water**

Sub-Matrix: <b>Water</b>					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: 80289) - continued										
VA20B4006-002	Anonymous	zirconium, dissolved	7440-67-7	E421	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----



<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM</b>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Company: Northwest Research and Monitoring Laura Gillon, Ashleigh Ballerona		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)		Regular [R] <input type="checkbox"/> Standard TAT if received by 3 pm																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Street: PO Box 4357		Email 1 or Fax: ashleigh@nwrm.ca		Date and Time Required for all E&P TATs:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
City/Province: Smithers BC		Email 2: laura.crossroadsccm@gmail.com		For tests that can not be performed according to the service level selected, Analysis F																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Environmental Division  
Vancouver  
Work Order Reference  
**VA20B4032**



Telephone: +1 604 253 4188

Terrace  
Shipping X  
Coolers

Please add field data to COA

Field Crew

Laura Guillon &amp; Ashleigh Ballerona

1 of 1

## Water Quality Sampling Field Card

Date	Aug 27, 2020	Water Stage	Water Colour	EMS #
Site	Shea Creek	(L) M/H	Clear	
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	51.0	DO (ppm)	10.31 <del>10.25</del>	Regular Suite Y/N Duplicate <input checked="" type="checkbox"/> Y/N
Cond (uS/cmA)	—	pH	7.82	Hydrocarbons Y/N Field Blank <input checked="" type="checkbox"/> Y/N
DO (%)	92.4	Water Temp	10.5	Ice Cover (cm) # Sample Bottles n/a 5 + 2 sp

Notes: weather: overcast +12°C

Time of Sample	11:30 am	Project	MWMT
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## Water Quality Sampling Field Card

Date	Aug 27, 2020	Water Stage	Water Colour	EMS #
Site	Gios well	(L) M/H	Clear	
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	76.6	DO (ppm)	10.52	Regular Suite <input checked="" type="checkbox"/> Y/N Duplicate <input checked="" type="checkbox"/> Y/N
Cond (uS/cmA)	—	pH	7.76	Hydrocarbons Y/N <input checked="" type="checkbox"/> Field Blank <input checked="" type="checkbox"/> Y/N
DO (%)	94.2	Water Temp	10.4	Ice Cover (cm) # Sample Bottles n/a 5 + fb

Notes: weather: overcast, +12°C

Time of Sample		Project	MWMT
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## Water Quality Sampling Field Card

Date	Aug 27, 2020	Water Stage	Water Colour	EMS #
Site	Crystal Creek	(L) M/H	Clear	
Field Parameters				QA/QC
Sp. Cond. (uS/cm)	77.8	DO (ppm)	10.79	Regular Suite <input checked="" type="checkbox"/> Y/N Duplicate <input checked="" type="checkbox"/> Y/N
Cond (uS/cmA)	—	pH	7.80	Hydrocarbons Y/N <input checked="" type="checkbox"/> Field Blank <input checked="" type="checkbox"/> Y/N
DO (%)	93.3	Water Temp	9.0	Ice Cover (cm) # Sample Bottles n/a 5

Notes: weather: overcast +12°C

Time of Sample	12:34 pm	Project	MWMT
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