



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>FC2302663</b>	Page	: 1 of 9
Client	: <b>Regional Municipality of Wood Buffalo</b>	Laboratory	: ALS Environmental - Fort McMurray
Contact	: Water Treatment Plant	Account Manager	: Megan Trydal
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Telephone	: 780-762-5863	Telephone	: +1 780 791 1524
Project	: Fort Chipewyan Imperial Release	Date Samples Received	: 18-Sep-2023 16:00
PO	: 4500051416	Date Analysis Commenced	: 19-Sep-2023
C-O-C number	: ----	Issue Date	: 22-Sep-2023 19:21
Sampler	: DM/DF		
Site	: Schedule 4: Fort Chip		
Quote number	: Q61323 (Fort chip)		
No. of samples received	: 1		
No. of samples analysed	: 1		

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
- Surrogate Control Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Archana Neupane	Lab Assistant	Metals, Calgary, Alberta
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
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Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, 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).

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units
psu	practical salinity units

<: less than.

>: greater than.

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

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

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



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water Pond One (Fort Chipewyan)	---	---	---	---
Client sampling date / time					18-Sep-2023 09:30	---	---	---	---	
Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as HCO <sub>3</sub> )	71-52-3	E290/CG	1.0	mg/L	61.6	---	---	---	---	
Alkalinity, carbonate (as CO <sub>3</sub> )	3812-32-6	E290/CG	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, hydroxide (as OH)	14280-30-9	E290/CG	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, total (as CaCO <sub>3</sub> )	---	E290/CG	1.0	mg/L	50.5	---	---	---	---	
Conductivity	---	E100/CG	1.0	µS/cm	133	---	---	---	---	
Hardness (as CaCO <sub>3</sub> ), dissolved	---	EC100/CG	0.50	mg/L	53.6	---	---	---	---	
Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg	---	EC100A/CG	0.50	mg/L	56.7	---	---	---	---	
pH	---	E108/CG	0.10	pH units	7.95	---	---	---	---	
Salinity	---	EC100S/VA	1.0	psu	<1.0	---	---	---	---	
Solids, total dissolved [TDS], calculated	---	EC103/CG	1.0	mg/L	75.8	---	---	---	---	
<b>Anions and Nutrients</b>										
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	4.24	---	---	---	---	
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L	0.070	---	---	---	---	
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L	<0.020	---	---	---	---	
Nitrate + Nitrite (as N)	---	EC235.N+N/C G	0.0300	mg/L	<0.0300	---	---	---	---	
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L	<0.010	---	---	---	---	
Sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4/CG	0.30	mg/L	8.88	---	---	---	---	
<b>Total Sulfides</b>										
Sulfide, total (as S)	18496-25-8	E395/VA	0.0015	mg/L	<0.0015	---	---	---	---	
<b>Ion Balance</b>										
Anion sum	---	EC101/CG	0.10	meq/L	1.32	---	---	---	---	
Cation sum	---	EC101/CG	0.10	meq/L	1.31	---	---	---	---	
Ion balance (APHA)	---	EC101/CG	0.01	%	-0.38	---	---	---	---	
Ion balance (cations/anions)	---	EC101/CG	0.010	%	99.2	---	---	---	---	
<b>Total Metals</b>										
Aluminum, total	7429-90-5	E420/CG	0.0030	mg/L	0.381	---	---	---	---	
Antimony, total	7440-36-0	E420/CG	0.00010	mg/L	<0.00010	---	---	---	---	
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L	0.00064	---	---	---	---	



**Analytical Results**

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water Pond One (Fort Chipewyan)	----	----	----	----
Client sampling date / time					18-Sep-2023 09:30	----	----	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Total Metals</b>										
Barium, total	7440-39-3	E420/CG	0.00010	mg/L	0.0368	----	----	----	----	
Beryllium, total	7440-41-7	E420/CG	0.000020	mg/L	0.000023	----	----	----	----	
Bismuth, total	7440-69-9	E420/CG	0.000050	mg/L	<0.000050	----	----	----	----	
Boron, total	7440-42-8	E420/CG	0.010	mg/L	0.020	----	----	----	----	
Cadmium, total	7440-43-9	E420/CG	0.0000050	mg/L	0.0000127	----	----	----	----	
Calcium, total	7440-70-2	E420/CG	0.050	mg/L	15.6	----	----	----	----	
Cesium, total	7440-46-2	E420/CG	0.000010	mg/L	0.000079	----	----	----	----	
Chromium, total	7440-47-3	E420/CG	0.00050	mg/L	0.00052	----	----	----	----	
Cobalt, total	7440-48-4	E420/CG	0.00010	mg/L	0.00019	----	----	----	----	
Copper, total	7440-50-8	E420/CG	0.00050	mg/L	0.00171	----	----	----	----	
Iron, total	7439-89-6	E420/CG	0.010	mg/L	0.620	----	----	----	----	
Lead, total	7439-92-1	E420/CG	0.000050	mg/L	0.000343	----	----	----	----	
Lithium, total	7439-93-2	E420/CG	0.0010	mg/L	0.0046	----	----	----	----	
Magnesium, total	7439-95-4	E420/CG	0.0050	mg/L	4.30	----	----	----	----	
Manganese, total	7439-96-5	E420/CG	0.00010	mg/L	0.0209	----	----	----	----	
Molybdenum, total	7439-98-7	E420/CG	0.000050	mg/L	0.000519	----	----	----	----	
Nickel, total	7440-02-0	E420/CG	0.00050	mg/L	0.00149	----	----	----	----	
Phosphorus, total	7723-14-0	E420/CG	0.050	mg/L	<0.050	----	----	----	----	
Potassium, total	7440-09-7	E420/CG	0.050	mg/L	1.22	----	----	----	----	
Rubidium, total	7440-17-7	E420/CG	0.00020	mg/L	0.00185	----	----	----	----	
Selenium, total	7782-49-2	E420/CG	0.000050	mg/L	0.000110	----	----	----	----	
Silicon, total	7440-21-3	E420/CG	0.10	mg/L	3.54	----	----	----	----	
Silver, total	7440-22-4	E420/CG	0.000010	mg/L	<0.000010	----	----	----	----	
Sodium, total	7440-23-5	E420/CG	0.050	mg/L	5.09	----	----	----	----	
Strontium, total	7440-24-6	E420/CG	0.00020	mg/L	0.0981	----	----	----	----	
Sulfur, total	7704-34-9	E420/CG	0.50	mg/L	3.21	----	----	----	----	
Tellurium, total	13494-80-9	E420/CG	0.00020	mg/L	<0.00020	----	----	----	----	
Thallium, total	7440-28-0	E420/CG	0.000010	mg/L	0.000010	----	----	----	----	
Thorium, total	7440-29-1	E420/CG	0.00010	mg/L	<0.00010	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water Pond One (Fort Chipewyan)	----	----	----	----
Client sampling date / time					18-Sep-2023 09:30	----	----	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Total Metals</b>										
Tin, total	7440-31-5	E420/CG	0.00010	mg/L	0.00135	----	----	----	----	
Titanium, total	7440-32-6	E420/CG	0.00030	mg/L	0.00632	----	----	----	----	
Tungsten, total	7440-33-7	E420/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Uranium, total	7440-61-1	E420/CG	0.000010	mg/L	0.000168	----	----	----	----	
Vanadium, total	7440-62-2	E420/CG	0.00050	mg/L	0.00133	----	----	----	----	
Zinc, total	7440-66-6	E420/CG	0.0030	mg/L	<0.0030	----	----	----	----	
Zirconium, total	7440-67-7	E420/CG	0.00020	mg/L	0.00029	----	----	----	----	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421/CG	0.0010	mg/L	0.0192	----	----	----	----	
Antimony, dissolved	7440-36-0	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Arsenic, dissolved	7440-38-2	E421/CG	0.00010	mg/L	0.00045	----	----	----	----	
Barium, dissolved	7440-39-3	E421/CG	0.00010	mg/L	0.0323	----	----	----	----	
Beryllium, dissolved	7440-41-7	E421/CG	0.000020	mg/L	<0.000020	----	----	----	----	
Bismuth, dissolved	7440-69-9	E421/CG	0.000050	mg/L	<0.000050	----	----	----	----	
Boron, dissolved	7440-42-8	E421/CG	0.010	mg/L	0.016	----	----	----	----	
Cadmium, dissolved	7440-43-9	E421/CG	0.0000050	mg/L	0.0000051	----	----	----	----	
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L	14.8	----	----	----	----	
Cesium, dissolved	7440-46-2	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----	
Chromium, dissolved	7440-47-3	E421/CG	0.00050	mg/L	<0.00050	----	----	----	----	
Cobalt, dissolved	7440-48-4	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Copper, dissolved	7440-50-8	E421/CG	0.00020	mg/L	0.00119	----	----	----	----	
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L	0.078	----	----	----	----	
Lead, dissolved	7439-92-1	E421/CG	0.000050	mg/L	0.000071	----	----	----	----	
Lithium, dissolved	7439-93-2	E421/CG	0.0010	mg/L	0.0040	----	----	----	----	
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L	4.04	----	----	----	----	
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L	0.00199	----	----	----	----	
Molybdenum, dissolved	7439-98-7	E421/CG	0.000050	mg/L	0.000508	----	----	----	----	
Nickel, dissolved	7440-02-0	E421/CG	0.00050	mg/L	0.00091	----	----	----	----	
Phosphorus, dissolved	7723-14-0	E421/CG	0.050	mg/L	<0.050	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water Pond One (Fort Chipewyan)	----	----	----	----
Client sampling date / time					18-Sep-2023 09:30	----	----	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Dissolved Metals</b>										
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L	1.10	----	----	----	----	
Rubidium, dissolved	7440-17-7	E421/CG	0.00020	mg/L	0.00114	----	----	----	----	
Selenium, dissolved	7782-49-2	E421/CG	0.000050	mg/L	0.000108	----	----	----	----	
Silicon, dissolved	7440-21-3	E421/CG	0.050	mg/L	2.77	----	----	----	----	
Silver, dissolved	7440-22-4	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----	
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L	4.76	----	----	----	----	
Strontium, dissolved	7440-24-6	E421/CG	0.00020	mg/L	0.0966	----	----	----	----	
Sulfur, dissolved	7704-34-9	E421/CG	0.50	mg/L	3.18	----	----	----	----	
Tellurium, dissolved	13494-80-9	E421/CG	0.00020	mg/L	<0.00020	----	----	----	----	
Thallium, dissolved	7440-28-0	E421/CG	0.000010	mg/L	<0.000010	----	----	----	----	
Thorium, dissolved	7440-29-1	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Tin, dissolved	7440-31-5	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Titanium, dissolved	7440-32-6	E421/CG	0.00030	mg/L	0.00242	----	----	----	----	
Tungsten, dissolved	7440-33-7	E421/CG	0.00010	mg/L	<0.00010	----	----	----	----	
Uranium, dissolved	7440-61-1	E421/CG	0.000010	mg/L	0.000140	----	----	----	----	
Vanadium, dissolved	7440-62-2	E421/CG	0.00050	mg/L	<0.00050	----	----	----	----	
Zinc, dissolved	7440-66-6	E421/CG	0.0010	mg/L	0.0011	----	----	----	----	
Zirconium, dissolved	7440-67-7	E421/CG	0.00030	mg/L	<0.00030	----	----	----	----	
Dissolved metals filtration location	----	EP421/CG	-	-	Laboratory	----	----	----	----	
<b>Aggregate Organics</b>										
Naphthenic acids	----	E565-L/EO	0.10	mg/L	<0.10	----	----	----	----	
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>										
Benzene	71-43-2	E611A/CG	0.50	µg/L	<0.50	----	----	----	----	
Ethylbenzene	100-41-4	E611A/CG	0.50	µg/L	<0.50	----	----	----	----	
Toluene	108-88-3	E611A/CG	0.50	µg/L	<0.50	----	----	----	----	
Xylene, m+p-	179601-23-1	E611A/CG	0.50	µg/L	<0.50	----	----	----	----	
Xylene, o-	95-47-6	E611A/CG	0.50	µg/L	<0.50	----	----	----	----	
Xylenes, total	1330-20-7	E611A/CG	0.75	µg/L	<0.75	----	----	----	----	
BTEX, total	----	E611A/CG	1.2	µg/L	<1.2	----	----	----	----	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Raw Water Pond One (Fort Chipewyan)	----	----	----	----
Client sampling date / time					18-Sep-2023 09:30	----	----	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Hydrocarbons</b>										
F1 (C6-C10)	----	E581.F1/CG	100	µg/L	<100	----	----	----	----	
F1-BTEX	----	EC580/CG	100	µg/L	<100	----	----	----	----	
F2 (C10-C16)	----	E601/CG	100	µg/L	<100	----	----	----	----	
F3 (C16-C34)	----	E601/CG	250	µg/L	<250	----	----	----	----	
F4 (C34-C50)	----	E601/CG	250	µg/L	<250	----	----	----	----	
Hydrocarbons, total (C6-C50)	----	EC581/CG	400	µg/L	<400	----	----	----	----	
<b>Hydrocarbons Surrogates</b>										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/CG	1.0	%	94.2	----	----	----	----	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/CG	1.0	%	115	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611A/CG	1.0	%	81.8	----	----	----	----	
Difluorobenzene, 1,4-	540-36-3	E611A/CG	1.0	%	97.0	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
Acenaphthene	83-32-9	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Acenaphthylene	208-96-8	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Acridine	260-94-6	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Anthracene	120-12-7	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Benz(a)anthracene	56-55-3	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Benzo(a)pyrene	50-32-8	E641A/CG	0.0050	µg/L	<0.0050	----	----	----	----	
Benzo(b+j)fluoranthene	n/a	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Benzo(b+j+k)fluoranthene	n/a	E641A/CG	0.015	µg/L	<0.015	----	----	----	----	
Benzo(g,h,i)perylene	191-24-2	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Benzo(k)fluoranthene	207-08-9	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Chrysene	218-01-9	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Dibenz(a,h)anthracene	53-70-3	E641A/CG	0.0050	µg/L	<0.0050	----	----	----	----	
Fluoranthene	206-44-0	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Fluorene	86-73-7	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Methylnaphthalene, 1-	90-12-0	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	





## Analytical Results

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Analyte	CAS Number	Method/Lab	LOR	Unit	FC2302663-001	-----	-----	-----	-----	
					Result	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons</b>										
Methylnaphthalene, 1+2-	----	E641A/CG	0.015	µg/L	<0.015	----	----	----	----	
Methylnaphthalene, 2-	91-57-6	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Naphthalene	91-20-3	E641A/CG	0.050	µg/L	<0.050	----	----	----	----	
Phenanthrene	85-01-8	E641A/CG	0.020	µg/L	<0.020	----	----	----	----	
Pyrene	129-00-0	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
Quinoline	91-22-5	E641A/CG	0.050	µg/L	<0.050	----	----	----	----	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A/CG	0.010	µg/L	<0.010	----	----	----	----	
PAHs, high molecular weight (BC AWQ)	n/a	E641A/CG	0.030	µg/L	<0.030	----	----	----	----	
PAHs, low molecular weight (BC AWQ)	n/a	E641A/CG	0.060	µg/L	<0.060	----	----	----	----	
PAHs, total (CCME sewer 18)	n/a	E641A/CG	0.070	µg/L	<0.070	----	----	----	----	
PAHs, total (EPA 16)	n/a	E641A/CG	0.065	µg/L	<0.065	----	----	----	----	
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>										
Chrysene-d12	1719-03-5	E641A/CG	0.1	%	89.8	----	----	----	----	
Naphthalene-d8	1146-65-2	E641A/CG	0.1	%	106	----	----	----	----	
Phenanthrene-d10	1517-22-2	E641A/CG	0.1	%	79.9	----	----	----	----	

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

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



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>FC2302663</b>	Page	: 1 of 6
<b>Client</b>	: <b>Regional Municipality of Wood Buffalo</b>	<b>Laboratory</b>	: ALS Environmental - Fort McMurray
<b>Contact</b>	: Water Treatment Plant	<b>Account Manager</b>	: Megan Trydal
<b>Address</b>	: 1 Silin Forest Road Fort McMurray AB Canada T9H 5A1	<b>Address</b>	: #4, 340 Macalpine Crescent Fort McMurray AB Canada T9H 4A8
<b>Telephone</b>	: 780-762-5863	<b>Telephone</b>	: +1 780 791 1524
<b>Project</b>	: Fort Chipewyan Imperial Release	<b>Date Samples Received</b>	: 18-Sep-2023 16:00
<b>PO</b>	: 4500051416	<b>Date Analysis</b>	: 19-Sep-2023
<b>C-O-C number</b>	: ----	<b>Commenced</b>	
<b>Sampler</b>	: DM/DF	<b>Issue Date</b>	: 22-Sep-2023 19:21
<b>Site</b>	: Schedule 4: Fort Chip		
<b>Quote number</b>	: Q61323 (Fort chip)		
<b>No. of samples received</b>	: 1		
<b>No. of samples analysed</b>	: 1		

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
- Surrogate Control Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Archana Neupane	Lab Assistant	Metals, Calgary, Alberta
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Jyotsnarani Devi	Laboratory Analyst	Organics, Calgary, Alberta
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, 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).

Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.

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.

<i>Unit</i>	<i>Description</i>
-	no units
%	percent
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units
psu	practical salinity units

>: greater than.

<: less than.

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

FC2302663-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Raw Water Pond One (Fort Chipewyan) -

Client sampling date / time: 18-Sep-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QC/Lot
<b>Physical Tests</b>								
Alkalinity, bicarbonate (as HCO <sub>3</sub> )	71-52-3	61.6	1.0	mg/L	E290/CG	19-Sep-2023	19-Sep-2023	1141350
Alkalinity, carbonate (as CO <sub>3</sub> )	3812-32-6	<1.0	1.0	mg/L	E290/CG	19-Sep-2023	19-Sep-2023	1141350
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	19-Sep-2023	19-Sep-2023	1141350
Alkalinity, total (as CaCO <sub>3</sub> )	----	50.5	1.0	mg/L	E290/CG	19-Sep-2023	19-Sep-2023	1141350
Conductivity	----	133	1.0	µS/cm	E100/CG	19-Sep-2023	19-Sep-2023	1141349
Hardness (as CaCO <sub>3</sub> ), dissolved	----	53.6	0.50	mg/L	EC100/CG	-	20-Sep-2023	-
Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg	----	56.7	0.50	mg/L	EC100A/CG	-	20-Sep-2023	-
pH	----	7.95	0.10	pH units	E108/CG	19-Sep-2023	19-Sep-2023	1141348
Salinity	----	<1.0	1.0	psu	EC100S/VA	-	22-Sep-2023	-
Solids, total dissolved [TDS], calculated	----	75.8	1.0	mg/L	EC103/CG	-	20-Sep-2023	-
<b>Anions and Nutrients</b>								
Chloride	16887-00-6	4.24	0.50	mg/L	E235.Cl/CG	19-Sep-2023	19-Sep-2023	1141685
Fluoride	16984-48-8	0.070	0.020	mg/L	E235.F/CG	19-Sep-2023	19-Sep-2023	1141677
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/CG	19-Sep-2023	19-Sep-2023	1141683
Nitrate + Nitrite (as N)	----	<0.0300	0.03	mg/L	EC235.N+N/CG	-	20-Sep-2023	1143239
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/CG	19-Sep-2023	19-Sep-2023	1141684
Sulfate (as SO <sub>4</sub> )	14808-79-8	8.88	0.30	mg/L	E235.SO4/CG	19-Sep-2023	19-Sep-2023	1141682
<b>Total Sulfides</b>								
Sulfide, total (as S)	18496-25-8	<0.0015	0.0015	mg/L	E395/VA	-	21-Sep-2023	1145602
<b>Ion Balance</b>								
Anion sum	----	1.32	0.10	meq/L	EC101/CG	-	20-Sep-2023	-
Cation sum	----	1.31	0.10	meq/L	EC101/CG	-	20-Sep-2023	-
Ion balance (APHA)	----	-0.38	0.01	%	EC101/CG	-	20-Sep-2023	-
Ion balance (cations/anions)	----	99.2	0.010	%	EC101/CG	-	20-Sep-2023	-
<b>Total Metals</b>								
Aluminum, total	7429-90-5	0.381	0.0030	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Antimony, total	7440-36-0	<0.00010	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Arsenic, total	7440-38-2	0.00064	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Barium, total	7440-39-3	0.0368	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Beryllium, total	7440-41-7	0.000023	0.000020	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Bismuth, total	7440-69-9	<0.000050	0.000050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Boron, total	7440-42-8	0.020	0.010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Cadmium, total	7440-43-9	0.0000127	0.0000050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Calcium, total	7440-70-2	15.6	0.050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Cesium, total	7440-46-2	0.000079	0.000010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Chromium, total	7440-47-3	0.00052	0.00050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Cobalt, total	7440-48-4	0.00019	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Copper, total	7440-50-8	0.00171	0.00050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Iron, total	7439-89-6	0.620	0.010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Lead, total	7439-92-1	0.000343	0.000050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Lithium, total	7439-93-2	0.0046	0.0010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Magnesium, total	7439-95-4	4.30	0.0050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Manganese, total	7439-96-5	0.0209	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Molybdenum, total	7439-98-7	0.000519	0.000050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Nickel, total	7440-02-0	0.00149	0.00050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637



## Analytical Results

FC2302663-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Raw Water Pond One (Fort Chipewyan) -

Client sampling date / time: 18-Sep-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
<b>Total Metals</b>								
Phosphorus, total	7723-14-0	<0.050	0.050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Potassium, total	7440-09-7	1.22	0.050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Rubidium, total	7440-17-7	0.00185	0.00020	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Selenium, total	7782-49-2	0.000110	0.000050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Silicon, total	7440-21-3	3.54	0.10	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Silver, total	7440-22-4	<0.000010	0.000010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Sodium, total	7440-23-5	5.09	0.050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Strontium, total	7440-24-6	0.0981	0.00020	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Sulfur, total	7704-34-9	3.21	0.50	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Tellurium, total	13494-80-9	<0.00020	0.00020	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Thallium, total	7440-28-0	0.000010	0.000010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Thorium, total	7440-29-1	<0.00010	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Tin, total	7440-31-5	0.00135	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Titanium, total	7440-32-6	0.00632	0.00030	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Tungsten, total	7440-33-7	<0.00010	0.00010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Uranium, total	7440-61-1	0.000168	0.000010	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Vanadium, total	7440-62-2	0.00133	0.00050	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Zinc, total	7440-66-6	<0.0030	0.0030	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
Zirconium, total	7440-67-7	0.00029	0.00020	mg/L	E420/CG	20-Sep-2023	20-Sep-2023	1142637
<b>Dissolved Metals</b>								
Aluminum, dissolved	7429-90-5	0.0192	0.0010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Antimony, dissolved	7440-36-0	<0.00010	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Arsenic, dissolved	7440-38-2	0.00045	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Barium, dissolved	7440-39-3	0.0323	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Beryllium, dissolved	7440-41-7	<0.000020	0.000020	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Bismuth, dissolved	7440-69-9	<0.000050	0.000050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Boron, dissolved	7440-42-8	0.016	0.010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Cadmium, dissolved	7440-43-9	0.0000051	0.0000050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Calcium, dissolved	7440-70-2	14.8	0.050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Cesium, dissolved	7440-46-2	<0.000010	0.000010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Chromium, dissolved	7440-47-3	<0.00050	0.00050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Cobalt, dissolved	7440-48-4	<0.00010	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Copper, dissolved	7440-50-8	0.00119	0.00020	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Iron, dissolved	7439-89-6	0.078	0.010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Lead, dissolved	7439-92-1	0.000071	0.000050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Lithium, dissolved	7439-93-2	0.0040	0.0010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Magnesium, dissolved	7439-95-4	4.04	0.0050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Manganese, dissolved	7439-96-5	0.00199	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Molybdenum, dissolved	7439-98-7	0.000508	0.000050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Nickel, dissolved	7440-02-0	0.00091	0.00050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Phosphorus, dissolved	7723-14-0	<0.050	0.050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Potassium, dissolved	7440-09-7	1.10	0.050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Rubidium, dissolved	7440-17-7	0.00114	0.00020	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Selenium, dissolved	7782-49-2	0.000108	0.000050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Silicon, dissolved	7440-21-3	2.77	0.050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635



## Analytical Results

FC2302663-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Raw Water Pond One (Fort Chipewyan) -

Client sampling date / time: 18-Sep-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
<b>Dissolved Metals</b>								
Silver, dissolved	7440-22-4	<0.000010	0.000010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Sodium, dissolved	7440-23-5	4.76	0.050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Strontium, dissolved	7440-24-6	0.0966	0.00020	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Sulfur, dissolved	7704-34-9	3.18	0.50	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Tellurium, dissolved	13494-80-9	<0.00020	0.00020	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Thallium, dissolved	7440-28-0	<0.000010	0.000010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Thorium, dissolved	7440-29-1	<0.00010	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Tin, dissolved	7440-31-5	<0.00010	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Titanium, dissolved	7440-32-6	0.00242	0.00030	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Tungsten, dissolved	7440-33-7	<0.00010	0.00010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Uranium, dissolved	7440-61-1	0.000140	0.000010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Vanadium, dissolved	7440-62-2	<0.00050	0.00050	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Zinc, dissolved	7440-66-6	0.0011	0.0010	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Zirconium, dissolved	7440-67-7	<0.00030	0.00030	mg/L	E421/CG	20-Sep-2023	20-Sep-2023	1142635
Dissolved metals filtration location	----	Laboratory	-	-	EP421/CG	-	20-Sep-2023	1142635
<b>Aggregate Organics</b>								
Naphthenic acids	----	<0.10	0.10	mg/L	E565-L/EO	20-Sep-2023	20-Sep-2023	1143357
<b>Volatile Organic Compounds [BTEXS+MTBE]</b>								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Xylene, m+p-	179601-23-1	<0.50	0.50	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Xylene, o-	95-47-6	<0.50	0.50	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Xylenes, total	1330-20-7	<0.75	0.75	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
BTEX, total	----	<1.2	1.2	µg/L	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
<b>Hydrocarbons</b>								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/CG	19-Sep-2023	19-Sep-2023	1141768
F1-BTEX	----	<100	100	µg/L	EC580/CG	-	20-Sep-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/CG	19-Sep-2023	20-Sep-2023	1141722
F3 (C16-C34)	----	<250	250	µg/L	E601/CG	19-Sep-2023	20-Sep-2023	1141722
F4 (C34-C50)	----	<250	250	µg/L	E601/CG	19-Sep-2023	20-Sep-2023	1141722
Hydrocarbons, total (C6-C50)	----	<400	400	µg/L	EC581/CG	-	20-Sep-2023	-
<b>Hydrocarbons Surrogates</b>								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	94.2	1.0	%	E601/CG	19-Sep-2023	20-Sep-2023	1141722
Dichlorotoluene, 3,4-	95-75-0	115	1.0	%	E581.F1/CG	19-Sep-2023	19-Sep-2023	1141768
<b>Volatile Organic Compounds Surrogates</b>								
Bromofluorobenzene, 4-	460-00-4	81.8	1.0	%	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
Difluorobenzene, 1,4-	540-36-3	97.0	1.0	%	E611A/CG	19-Sep-2023	19-Sep-2023	1141767
<b>Polycyclic Aromatic Hydrocarbons</b>								
Acenaphthene	83-32-9	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Acridine	260-94-6	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Anthracene	120-12-7	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725



## Analytical Results

FC2302663-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Raw Water Pond One (Fort Chipewyan) -

Client sampling date / time: 18-Sep-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
<b>Polycyclic Aromatic Hydrocarbons</b>								
Benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Benzo(b+j+k)fluoranthene	n/a	<0.015	0.015	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Chrysene	218-01-9	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Fluoranthene	206-44-0	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Fluorene	86-73-7	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Methylnaphthalene, 1-	90-12-0	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Methylnaphthalene, 1+2-	----	<0.015	0.015	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Methylnaphthalene, 2-	91-57-6	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Naphthalene	91-20-3	<0.050	0.050	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Phenanthrene	85-01-8	<0.020	0.020	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Pyrene	129-00-0	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Quinoline	91-22-5	<0.050	0.050	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
B(a)P total potency equivalents [B(a)P TPE]	----	<0.010	0.010	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
PAHs, high molecular weight (BC AWQ)	n/a	<0.030	0.03	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
PAHs, low molecular weight (BC AWQ)	n/a	<0.060	0.06	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
PAHs, total (CCME sewer 18)	n/a	<0.070	0.07	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
PAHs, total (EPA 16)	n/a	<0.065	0.065	µg/L	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
<b>Polycyclic Aromatic Hydrocarbons Surrogates</b>								
Chrysene-d12	1719-03-5	89.8	0.1	%	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Naphthalene-d8	1146-65-2	106	0.1	%	E641A/CG	19-Sep-2023	19-Sep-2023	1141725
Phenanthrene-d10	1517-22-2	79.9	0.1	%	E641A/CG	19-Sep-2023	19-Sep-2023	1141725

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

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




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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>FC2302663</b></p> <p><b>Client</b> : <b>Regional Municipality of Wood Buffalo</b></p> <p><b>Contact</b> : Water Treatment Plant</p> <p><b>Address</b> : 1 Silin Forest Road Fort McMurray AB Canada T9H 5A1</p> <p><b>Telephone</b> : 780-762-5863</p> <p><b>Project</b> : Fort Chipewyan Imperial Release</p> <p><b>PO</b> : 4500051416</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : DM/DF</p> <p><b>Site</b> : Schedule 4: Fort Chip</p> <p><b>Quote number</b> : Q61323 (Fort chip)</p> <p><b>No. of samples received</b> : 1</p> <p><b>No. of samples analysed</b> : 1</p>	<p><b>Page</b> : 1 of 11</p> <p><b>Laboratory</b> : ALS Environmental - Fort McMurray</p> <p><b>Account Manager</b> : Megan Trydal</p> <p><b>Address</b> : #4, 340 Macalpine Crescent Fort McMurray, Alberta Canada T9H 4A8</p> <p><b>Telephone</b> : +1 780 791 1524</p> <p><b>Date Samples Received</b> : 18-Sep-2023 16:00</p> <p><b>Issue Date</b> : 22-Sep-2023 19:21</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
  - CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
  - DQO: Data Quality Objective.
  - LOR: Limit of Reporting (detection limit).
  - RPD: Relative Percent Difference.
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### ***Workorder Comments***

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

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

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

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



## Analysis Holding Time Compliance

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

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

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

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

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Aggregate Organics : Naphthenics Acids by FT-IR (low level)</b>											
<b>Amber glass/Teflon lined cap</b> Raw Water Pond One (Fort Chipewyan)	E565-L	18-Sep-2023	20-Sep-2023	14 days	2 days	✔	20-Sep-2023	14 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E235.Cl	18-Sep-2023	19-Sep-2023	28 days	1 days	✔	19-Sep-2023	28 days	1 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E235.F	18-Sep-2023	19-Sep-2023	28 days	1 days	✔	19-Sep-2023	28 days	1 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E235.NO3	18-Sep-2023	19-Sep-2023	3 days	1 days	✔	19-Sep-2023	3 days	1 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E235.NO2	18-Sep-2023	19-Sep-2023	3 days	1 days	✔	19-Sep-2023	3 days	1 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E235.SO4	18-Sep-2023	19-Sep-2023	28 days	1 days	✔	19-Sep-2023	28 days	1 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE - dissolved (lab preserved)</b> Raw Water Pond One (Fort Chipewyan)	E421	18-Sep-2023	20-Sep-2023	180 days	2 days	✔	20-Sep-2023	180 days	2 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		
<b>Hydrocarbons : CCME PHC - F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> Raw Water Pond One (Fort Chipewyan)	E581.F1	18-Sep-2023	19-Sep-2023	14 days	1 days	✓	19-Sep-2023	14 days	1 days	✓	
<b>Hydrocarbons : CCME PHCs - F2-F4 by GC-FID</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Raw Water Pond One (Fort Chipewyan)	E601	18-Sep-2023	19-Sep-2023	14 days	1 days	✓	20-Sep-2023	40 days	1 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E290	18-Sep-2023	19-Sep-2023	14 days	1 days	✓	19-Sep-2023	14 days	1 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E100	18-Sep-2023	19-Sep-2023	28 days	1 days	✓	19-Sep-2023	28 days	1 days	✓	
<b>Physical Tests : pH by Meter</b>											
<b>HDPE</b> Raw Water Pond One (Fort Chipewyan)	E108	18-Sep-2023	19-Sep-2023	0.25 hrs	24 hrs	* EHTR-FM	19-Sep-2023	0.25 hrs	24 hrs	* EHTR-FM	
<b>Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS</b>											
<b>Amber glass/Teflon lined cap (sodium bisulfate)</b> Raw Water Pond One (Fort Chipewyan)	E641A	18-Sep-2023	19-Sep-2023	14 days	1 days	✓	19-Sep-2023	40 days	0 days	✓	
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>											
<b>HDPE - total (lab preserved)</b> Raw Water Pond One (Fort Chipewyan)	E420	18-Sep-2023	20-Sep-2023	180 days	2 days	✓	20-Sep-2023	180 days	2 days	✓	
<b>Total Sulfides : Total Sulfide by Colourimetry (Automated Flow)</b>											
<b>HDPE total (zinc acetate+sodium hydroxide)</b> Raw Water Pond One (Fort Chipewyan)	E395	18-Sep-2023	----	----	----		21-Sep-2023	7 days	3 days	✓	
<b>Volatile Organic Compounds [BTEXS+MTBE] : BTEX by Headspace GC-MS</b>											
<b>Glass vial (sodium bisulfate)</b> Raw Water Pond One (Fort Chipewyan)	E611A	18-Sep-2023	19-Sep-2023	14 days	1 days	✓	19-Sep-2023	14 days	1 days	✓	

[Legend & Qualifier Definitions](#)

Page : 5 of 11  
Work Order : FC2302663  
Client : Regional Municipality of Wood Buffalo  
Project : Fort Chipewyan Imperial Release

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EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
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 (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1141350	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	1141767	1	10	10.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1141768	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1141685	1	1	100.0	5.0	✓
Conductivity in Water	E100	1141349	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1142635	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1141677	1	19	5.2	5.0	✓
Naphthenics Acids by FT-IR (low level)	E565-L	1143357	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1141683	1	1	100.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1141684	1	1	100.0	5.0	✓
pH by Meter	E108	1141348	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1141682	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1142637	1	17	5.8	5.0	✓
Total Sulfide by Colourimetry (Automated Flow)	E395	1145602	1	1	100.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1141350	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	1141767	1	10	10.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1141768	1	4	25.0	5.0	✓
CCME PHCs - F2-F4 by GC-FID	E601	1141722	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1141685	1	1	100.0	5.0	✓
Conductivity in Water	E100	1141349	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1142635	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1141677	1	19	5.2	5.0	✓
Naphthenics Acids by FT-IR (low level)	E565-L	1143357	1	1	100.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1141683	1	1	100.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1141684	1	1	100.0	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	1141725	1	7	14.2	5.0	✓
pH by Meter	E108	1141348	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1141682	1	19	5.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1142637	1	17	5.8	5.0	✓
Total Sulfide by Colourimetry (Automated Flow)	E395	1145602	1	1	100.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1141350	1	16	6.2	5.0	✓
BTEX by Headspace GC-MS	E611A	1141767	1	10	10.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID	E581.F1	1141768	1	4	25.0	5.0	✓



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
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
CCME PHCs - F2-F4 by GC-FID	E601	1141722	1	4	25.0	5.0	✔
Chloride in Water by IC	E235.Cl	1141685	1	1	100.0	5.0	✔
Conductivity in Water	E100	1141349	1	16	6.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1142635	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1141677	1	19	5.2	5.0	✔
Naphthenics Acids by FT-IR (low level)	E565-L	1143357	1	1	100.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1141683	1	1	100.0	5.0	✔
Nitrite in Water by IC	E235.NO2	1141684	1	1	100.0	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	1141725	1	7	14.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1141682	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1142637	1	17	5.8	5.0	✔
Total Sulfide by Colourimetry (Automated Flow)	E395	1145602	1	1	100.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
BTEX by Headspace GC-MS	E611A	1141767	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	1141685	0	1	0.0	5.0	✖
Dissolved Metals in Water by CRC ICPMS	E421	1142635	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1141677	1	19	5.2	5.0	✔
Naphthenics Acids by FT-IR (low level)	E565-L	1143357	0	1	0.0	5.0	✖
Nitrate in Water by IC	E235.NO3	1141683	0	1	0.0	5.0	✖
Nitrite in Water by IC	E235.NO2	1141684	0	1	0.0	5.0	✖
Sulfate in Water by IC	E235.SO4	1141682	1	19	5.2	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1142637	1	17	5.8	5.0	✔
Total Sulfide by Colourimetry (Automated Flow)	E395	1145602	0	1	0.0	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
Conductivity in Water	E100 ALS Environmental - Calgary	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Calgary	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Calgary	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Calgary	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.
Total Sulfide by Colourimetry (Automated Flow)	E395 ALS Environmental - Vancouver	Water	APHA 4500 -S E-Auto-Colorimetry	Sulfide is determined using the gas dialysis automated methylene blue colourimetric method. Results expressed "as H2S" if reported represent the maximum possible H2S concentration based on the total sulfide concentration in the sample. The H2S calculation converts Total Sulphide as (S2-) and reports it as Total Sulphide as (H2S)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Calgary	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Calgary	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.
Napthenics Acids by FT-IR (low level)	E565-L ALS Environmental - Edmonton	Water	Syncrude Canada 1994	Napthenic acids extract is analyzed by FTIR and the absorbances of the monomeric and dimeric forms of the carboxylic groups are measured.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Calgary	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Calgary	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4).  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Calgary	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A ALS Environmental - Calgary	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Calgary	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.





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Calgary	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.
Salinity in Water (calculation)	EC100S ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a seawater sample. Conductivity measurements are temperature-compensated to 25°C. Salinity in Practical Salinity Units is calculated.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Calgary	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Calgary	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Calgary	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
F1-BTEX	EC580 ALS Environmental - Calgary	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
Sum F1 to F4 (C6-C50)	EC581 ALS Environmental - Calgary	Water	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fractions F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50). F4G-sg is not used within this calculation due to overlap with other fractions.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Calgary	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Naphthenic Acids Extraction	EP565 ALS Environmental - Edmonton	Water	EPA 3510C (mod)	Naphthenic acids is extracted from aqueous sample using dichloromethane liquid-liquid extraction.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Calgary	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

Page : 11 of 11  
Work Order : FC2302663  
Client : Regional Municipality of Wood Buffalo  
Project : Fort Chipewyan Imperial Release



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
PHCs and PAHs Hexane Extraction	EP601  ALS Environmental - Calgary	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: FC2302663</b>	<b>Page</b>	: 1 of 17
<b>Client</b>	: Regional Municipality of Wood Buffalo	<b>Laboratory</b>	: ALS Environmental - Fort McMurray
<b>Contact</b>	: Water Treatment Plant	<b>Account Manager</b>	: Megan Trydal
<b>Address</b>	: 1 Silin Forest Road Fort McMurray AB Canada T9H 5A1	<b>Address</b>	: #4, 340 Macalpine Crescent Fort McMurray, Alberta Canada T9H 4A8
<b>Telephone</b>	:	<b>Telephone</b>	: +1 780 791 1524
<b>Project</b>	: Fort Chipewyan Imperial Release	<b>Date Samples Received</b>	: 18-Sep-2023 16:00
<b>PO</b>	: 4500051416	<b>Date Analysis Commenced</b>	: 19-Sep-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Sep-2023 19:21
<b>Sampler</b>	: DM/DF            780-762-5863		
<b>Site</b>	: Schedule 4: Fort Chip		
<b>Quote number</b>	: Q61323 (Fort chip)		
<b>No. of samples received</b>	: 1		
<b>No. of samples analysed</b>	: 1		

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

This Quality Control Report contains the following information:

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Archana Neupane	Lab Assistant	Calgary Metals, Calgary, Alberta
Cynthia Bauer	Organic Supervisor	Calgary Organics, Calgary, Alberta
Geoff Berg	Lab Analyst	Edmonton Organics, Edmonton, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Joshua Stessun	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Jyotsnarani Devi	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Katarzyna Glinka	Analyst	Calgary Inorganics, Calgary, Alberta
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Shirley Li	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 17  
Work Order : FC2302663  
Client : Regional Municipality of Wood Buffalo  
Project : Fort Chipewyan Imperial Release

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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 Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

## **Workorder Comments**

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

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### 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: 1141348)</b>											
CG2312874-002	Anonymous	pH	----	E108	0.10	pH units	7.89	7.95	0.758%	4%	----
<b>Physical Tests (QC Lot: 1141349)</b>											
CG2312877-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	281	282	0.355%	10%	----
<b>Physical Tests (QC Lot: 1141350)</b>											
CG2312877-002	Anonymous	Alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	111	111	0.541%	20%	----
<b>Anions and Nutrients (QC Lot: 1141677)</b>											
CG2312996-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.153	0.150	0.003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1141682)</b>											
CG2312996-001	Anonymous	Sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO <sub>4</sub>	1.50	mg/L	936	936	0.0264%	20%	----
<b>Anions and Nutrients (QC Lot: 1141683)</b>											
FC2302663-001	Raw Water Pond One (Fort Chipewyan)	Nitrate (as N)	14797-55-8	E235.NO <sub>3</sub>	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1141684)</b>											
FC2302663-001	Raw Water Pond One (Fort Chipewyan)	Nitrite (as N)	14797-65-0	E235.NO <sub>2</sub>	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1141685)</b>											
FC2302663-001	Raw Water Pond One (Fort Chipewyan)	Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.24	4.25	0.008	Diff <2x LOR	----
<b>Total Sulfides (QC Lot: 1145602)</b>											
FC2302663-001	Raw Water Pond One (Fort Chipewyan)	Sulfide, total (as S)	18496-25-8	E395	0.0015	mg/L	<0.0015	<0.0015	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 1142637)</b>											
CG2312996-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0097	0.0118	0.0021	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00029	0.00028	0.000010	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00018	0.00017	0.00001	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0260	0.0257	0.866%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.020 µg/L	<0.000020	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	0.074	0.076	0.002	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.369 µg/L	0.000369	0.214%	20%	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	256	262	2.33%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000040	0.000038	0.000002	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>Total Metals (QC Lot: 1142637) - continued</b>											
CG2312996-001	Anonymous	Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.43 µg/L	0.00046	0.00003	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00081	0.00031	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.018	0.018	0.0002	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0435	0.0427	1.81%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	162	160	1.06%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00477	0.00488	2.38%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000758	0.000741	2.25%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.0387	0.0386	0.229%	20%	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	3.94	3.96	0.542%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00413	0.00420	1.70%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	32.1 µg/L	0.0316	1.30%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	2.35	2.34	0.558%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	33.4	32.9	1.52%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.800	0.779	2.62%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	381	377	0.932%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	0.000056	0.000056	0.0000001	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00816	0.00808	1.06%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0270	0.0272	0.0003	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1142635)</b>											
CG2312996-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0020	mg/L	0.0024	<0.0020	0.0004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00020	mg/L	0.00030	0.00028	0.00001	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00020	mg/L	0.0262	0.0258	1.26%	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
<b>Dissolved Metals (QC Lot: 1142635) - continued</b>											
CG2312996-001	Anonymous	Beryllium, dissolved	7440-41-7	E421	0.000040	mg/L	<0.040 µg/L	<0.000040	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.020	mg/L	0.071	0.069	0.002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000100	mg/L	0.381 µg/L	0.000373	2.17%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.100	mg/L	248	241	3.18%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000020	mg/L	0.000035	0.000034	0.000002	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	0.00020	mg/L	0.41 µg/L	0.00038	0.00003	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0020	mg/L	0.0431	0.0417	3.17%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	156	151	3.67%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.00434	0.00434	0.188%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000100	mg/L	0.000770	0.000753	0.000017	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00100	mg/L	0.0372	0.0368	1.29%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	3.80	3.76	1.24%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00040	mg/L	0.00381	0.00377	0.00004	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000100	mg/L	33.0 µg/L	0.0324	2.03%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.100	mg/L	2.12	2.07	2.06%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	31.2	30.3	2.91%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00040	mg/L	0.780	0.766	1.77%	20%	----
		Sulfur, dissolved	7704-34-9	E421	1.00	mg/L	348	341	1.92%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000020	mg/L	0.000057	0.000051	0.000006	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000020	mg/L	0.00765	0.00748	2.27%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0020	mg/L	0.0284	0.0283	0.325%	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: 1142635) - continued</b>											
CG2312996-001	Anonymous	Zirconium, dissolved	7440-67-7	E421	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 1143357)</b>											
FC2302663-001	Raw Water Pond One (Fort Chipewyan)	Naphthenic acids	----	E565-L	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 1141767)</b>											
CG2312794-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 1141768)</b>											
CG2312794-001	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<100	<100	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: 1141349)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 1141350)</b>						
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Anions and Nutrients (QCLot: 1141677)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1141682)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1141683)</b>						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1141684)</b>						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	---
<b>Anions and Nutrients (QCLot: 1141685)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Total Sulfides (QCLot: 1145602)</b>						
Sulfide, total (as S)	18496-25-8	E395	0.0015	mg/L	<0.0015	---
<b>Total Metals (QCLot: 1142637)</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	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 1142637) - continued</b>						
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	----
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: 1142635)</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	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1142635) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Aggregate Organics (QCLot: 1143357)</b>						
Naphthenic acids	----	E565-L	0.1	mg/L	<0.10	----
<b>Volatile Organic Compounds (QCLot: 1141767)</b>						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 1141767) - continued</b>						
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 1141722)</b>						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
<b>Hydrocarbons (QCLot: 1141768)</b>						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 1141725)</b>						
Acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
Acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
Anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
Benzo(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
Chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
Fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
Naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
Pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
Quinoline	91-22-5	E641A	0.05	µg/L	<0.050	----



### Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1141348)</b>									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
<b>Physical Tests (QCLot: 1141349)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
<b>Physical Tests (QCLot: 1141350)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
<b>Anions and Nutrients (QCLot: 1141677)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 1141682)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 1141683)</b>									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1141684)</b>									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 1141685)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
<b>Total Sulfides (QCLot: 1145602)</b>									
Sulfide, total (as S)	18496-25-8	E395	0.0015	mg/L	0.08 mg/L	104	80.0	120	----
<b>Total Metals (QCLot: 1142637)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	102	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	98.5	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	99.7	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.3	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	93.3	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	95.0	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	91.7	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	97.2	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	96.2	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 1142637) - continued</b>									
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.7	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	115	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	96.6	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	94.5	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.7	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	98.8	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.0	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	112	70.0	130	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.4	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	94.9	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	60.0	140	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	93.5	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	98.9	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	100	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	92.1	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	94.8	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.5	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.4	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.4	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	94.7	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	95.1	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	97.4	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 1142635)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.4	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	100.0	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	92.5	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.8	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1142635) - continued</b>									
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.9	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.8	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	116	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	94.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	105	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.2	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	98.7	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	107	70.0	130	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	95.6	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	106	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	95.1	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	100	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	93.8	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	92.7	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.0	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	94.2	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	91.7	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	98.5	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
<b>Aggregate Organics (QCLot: 1143357)</b>									
Naphthenic acids	----	E565-L	0.1	mg/L	1 mg/L	110	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>Volatile Organic Compounds (QCLot: 1141767)</b>									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	94.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	87.6	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	85.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	89.7	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	89.9	70.0	130	----
<b>Hydrocarbons (QCLot: 1141722)</b>									
F2 (C10-C16)	----	E601	100	µg/L	3669.135 µg/L	125	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	6725.593 µg/L	114	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5061.271 µg/L	103	70.0	130	----
<b>Hydrocarbons (QCLot: 1141768)</b>									
F1 (C6-C10)	----	E581.F1	100	µg/L	2481 µg/L	127	70.0	130	----
<b>Polycyclic Aromatic Hydrocarbons (QCLot: 1141725)</b>									
Acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	97.3	60.0	130	----
Acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	85.6	60.0	130	----
Anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	89.2	60.0	130	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	90.6	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	85.2	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	90.8	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	98.8	60.0	130	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	93.9	60.0	130	----
Chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	91.7	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	97.4	60.0	130	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
Fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	98.6	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
Naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	122	50.0	130	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	93.2	60.0	130	----
Pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	99.1	60.0	130	----
Quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	108	60.0	130	----





## 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: 1141677)</b>										
CG2312996-002	Anonymous	Fluoride	16984-48-8	E235.F	0.914 mg/L	1 mg/L	91.4	75.0	125	----
<b>Anions and Nutrients (QCLot: 1141682)</b>										
CG2312996-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Total Metals (QCLot: 1142637)</b>										
CG2312996-002	Anonymous	Aluminum, total	7429-90-5	E420	1.97 mg/L	2 mg/L	98.7	70.0	130	----
		Antimony, total	7440-36-0	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.188 mg/L	0.2 mg/L	94.0	70.0	130	----
		Barium, total	7440-39-3	E420	0.188 mg/L	0.2 mg/L	94.0	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.390 mg/L	0.4 mg/L	97.5	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0956 mg/L	0.1 mg/L	95.6	70.0	130	----
		Boron, total	7440-42-8	E420	0.972 mg/L	1 mg/L	97.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	40 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		Chromium, total	7440-47-3	E420	0.384 mg/L	0.4 mg/L	96.0	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.198 mg/L	0.2 mg/L	99.3	70.0	130	----
		Copper, total	7440-50-8	E420	0.195 mg/L	0.2 mg/L	97.4	70.0	130	----
		Iron, total	7439-89-6	E420	19.6 mg/L	20 mg/L	97.9	70.0	130	----
		Lead, total	7439-92-1	E420	0.189 mg/L	0.2 mg/L	94.4	70.0	130	----
		Lithium, total	7439-93-2	E420	0.978 mg/L	1 mg/L	97.8	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.196 mg/L	0.2 mg/L	97.9	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Nickel, total	7440-02-0	E420	0.405 mg/L	0.4 mg/L	101	70.0	130	----
		Phosphorus, total	7723-14-0	E420	104 mg/L	100 mg/L	104	70.0	130	----
		Potassium, total	7440-09-7	E420	38.4 mg/L	40 mg/L	96.0	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.206 mg/L	0.2 mg/L	103	70.0	130	----
		Selenium, total	7782-49-2	E420	0.400 mg/L	0.4 mg/L	100	70.0	130	----
		Silicon, total	7440-21-3	E420	99.8 mg/L	100 mg/L	99.8	70.0	130	----
		Silver, total	7440-22-4	E420	0.0396 mg/L	0.04 mg/L	98.9	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>Total Metals (QCLot: 1142637) - continued</b>										
CG2312996-002	Anonymous	Sodium, total	7440-23-5	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	200 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.392 mg/L	0.4 mg/L	98.1	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		Thorium, total	7440-29-1	E420	0.199 mg/L	0.2 mg/L	99.4	70.0	130	----
		Tin, total	7440-31-5	E420	0.194 mg/L	0.2 mg/L	97.1	70.0	130	----
		Titanium, total	7440-32-6	E420	0.394 mg/L	0.4 mg/L	98.5	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		Uranium, total	7440-61-1	E420	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.998 mg/L	1 mg/L	99.8	70.0	130	----
		Zinc, total	7440-66-6	E420	3.88 mg/L	4 mg/L	97.1	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.397 mg/L	0.4 mg/L	99.2	70.0	130	----
<b>Dissolved Metals (QCLot: 1142635)</b>										
CG2312996-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	2.07 mg/L	2 mg/L	103	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.199 mg/L	0.2 mg/L	99.6	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.196 mg/L	0.2 mg/L	98.0	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.196 mg/L	0.2 mg/L	98.2	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.403 mg/L	0.4 mg/L	101	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0962 mg/L	0.1 mg/L	96.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.980 mg/L	1 mg/L	98.0	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.394 mg/L	0.4 mg/L	98.6	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.198 mg/L	0.2 mg/L	98.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	20.0 mg/L	20 mg/L	99.9	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.193 mg/L	0.2 mg/L	96.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	1.01 mg/L	1 mg/L	101	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	10 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.200 mg/L	0.2 mg/L	100	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.406 mg/L	0.4 mg/L	102	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	106 mg/L	100 mg/L	106	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: 1142635) - continued</b>										
CG2312996-002	Anonymous	Potassium, dissolved	7440-09-7	E421	39.5 mg/L	40 mg/L	98.7	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.208 mg/L	0.2 mg/L	104	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.409 mg/L	0.4 mg/L	102	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	99.7 mg/L	100 mg/L	99.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	200 mg/L	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.401 mg/L	0.4 mg/L	100	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0389 mg/L	0.04 mg/L	97.4	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.198 mg/L	0.2 mg/L	98.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.196 mg/L	0.2 mg/L	98.2	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.397 mg/L	0.4 mg/L	99.2	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.194 mg/L	0.2 mg/L	97.0	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	1.03 mg/L	1 mg/L	103	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	4.04 mg/L	4 mg/L	101	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.394 mg/L	0.4 mg/L	98.6	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 1141767)</b>										
CG2312794-001	Anonymous	Benzene	71-43-2	E611A	93.9 µg/L	100 µg/L	93.9	70.0	130	----
		Ethylbenzene	100-41-4	E611A	90.4 µg/L	100 µg/L	90.4	70.0	130	----
		Toluene	108-88-3	E611A	87.6 µg/L	100 µg/L	87.6	70.0	130	----
		Xylene, m+p-	179601-23-1	E611A	180 µg/L	200 µg/L	90.2	70.0	130	----
		Xylene, o-	95-47-6	E611A	90.6 µg/L	100 µg/L	90.6	70.0	130	----