CERTIFICATE OF ANALYSIS

Work Order	: **FC2302194**	Page	: 1 of 8
Client	: **Regional Municipality of Wood Buffalo**	Laboratory	: ALS Environmental - Fort McMurray
Contact	: Water Treatment Plant	Account Manager	: Megan Trydal
Address	: 1 Silin Forest Road Fort Mcmurray AB Canada T9H 5A1	Address	: #4, 340 Macalpine Crescent Fort McMurray AB Canada T9H 4A8
Telephone	: 780-762-5863	Telephone	: +1 780 791 1524
Project	: Fort Chipewyan Imperial Release	Date Samples Received	: 08-Aug-2023 15:50
PO	: 4500051416	Date Analysis Commenced	: 10-Aug-2023
C-O-C number	: ----	Issue Date	: 12-Aug-2023 12:01
Sampler	: DF, DM		
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.

Signatories	*Position*	*Laboratory Department*
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
Kate Dimitrova	Analsyt	Inorganics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Nguyen Tran	Laboratory Analyst	Organics, Calgary, Alberta
Victoria Piguing	Laboratory Analyst	Organics, Calgary, Alberta

General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
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**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Treated Water	----	----	----	----
					Client sampling date / time: 08-Aug-2023 09:00	----	----	----	----
					FC2302194-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	120	----	----	----	----
Alkalinity, carbonate (as CO3)	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 CaCO3)	----	E290/CG	1.0	mg/L	98.1	----	----	----	----
Conductivity	----	E100/CG	1.0	µS/cm	350	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L	86.0	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/CG	0.50	mg/L	86.3	----	----	----	----
pH	----	E108/CG	0.10	pH units	7.94	----	----	----	----
Salinity	----	EC100S/VA	1.0	psu	<1.0	----	----	----	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L	197	----	----	----	----
Anions and Nutrients									
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	50.1	----	----	----	----
Fluoride	16984-48-8	E235.F/CG	0.020	mg/L	<0.020	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/CG	0.020	mg/L	0.085	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0300	mg/L	0.0850	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/CG	0.010	mg/L	<0.010	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/CG	0.30	mg/L	11.0	----	----	----	----
Total Sulfides									
Sulfide, total (as S)	18496-25-8	E395/VA	0.0015	mg/L	0.0024	----	----	----	----
Ion Balance									
Anion sum	----	EC101/CG	0.10	meq/L	3.61	----	----	----	----
Cation sum	----	EC101/CG	0.10	meq/L	3.47	----	----	----	----
Ion balance (APHA)	----	EC101/CG	0.01	%	-1.98	----	----	----	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%	96.1	----	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/CG	0.0030	mg/L	0.0154	----	----	----	----
Antimony, total	7440-36-0	E420/CG	0.00010	mg/L	0.00011	----	----	----	----
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L	0.00050	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Treated Water	----	----	----	----
					Client sampling date / time	08-Aug-2023 09:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		FC2302194-001	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Barium, total	7440-39-3	E420/CG	0.00010	mg/L		0.0529	----	----	----	----
Beryllium, total	7440-41-7	E420/CG	0.000020	mg/L		<0.000020	----	----	----	----
Bismuth, total	7440-69-9	E420/CG	0.000050	mg/L		<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/CG	0.010	mg/L		0.024	----	----	----	----
Cadmium, total	7440-43-9	E420/CG	0.0000050	mg/L		0.0000056	----	----	----	----
Calcium, total	7440-70-2	E420/CG	0.050	mg/L		24.9	----	----	----	----
Cesium, total	7440-46-2	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----
Chromium, total	7440-47-3	E420/CG	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/CG	0.00010	mg/L		<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/CG	0.00050	mg/L		0.00239	----	----	----	----
Iron, total	7439-89-6	E420/CG	0.010	mg/L		<0.010	----	----	----	----
Lead, total	7439-92-1	E420/CG	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/CG	0.0010	mg/L		0.0046	----	----	----	----
Magnesium, total	7439-95-4	E420/CG	0.0050	mg/L		5.87	----	----	----	----
Manganese, total	7439-96-5	E420/CG	0.00010	mg/L		0.0180	----	----	----	----
Molybdenum, total	7439-98-7	E420/CG	0.000050	mg/L		0.000350	----	----	----	----
Nickel, total	7440-02-0	E420/CG	0.00050	mg/L		0.00103	----	----	----	----
Phosphorus, total	7723-14-0	E420/CG	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/CG	0.050	mg/L		1.50	----	----	----	----
Rubidium, total	7440-17-7	E420/CG	0.00020	mg/L		0.00175	----	----	----	----
Selenium, total	7782-49-2	E420/CG	0.000050	mg/L		0.000064	----	----	----	----
Silicon, total	7440-21-3	E420/CG	0.10	mg/L		1.98	----	----	----	----
Silver, total	7440-22-4	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/CG	0.050	mg/L		39.5	----	----	----	----
Strontium, total	7440-24-6	E420/CG	0.00020	mg/L		0.148	----	----	----	----
Sulfur, total	7704-34-9	E420/CG	0.50	mg/L		4.18	----	----	----	----
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	----	----	----	----
Tin, total	7440-31-5	E420/CG	0.00010	mg/L		<0.00010	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Treated Water	----	----	----	----
					Client sampling date / time	08-Aug-2023 09:00	----	----	----	----
					FC2302194-001	--------	--------	--------	--------	
					Result	----	----	----	----	
Total Metals										
Titanium, total	7440-32-6	E420/CG	0.00030	mg/L		<0.00030	----	----	----	----
Tungsten, total	7440-33-7	E420/CG	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, total	7440-61-1	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----
Vanadium, total	7440-62-2	E420/CG	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/CG	0.0030	mg/L		<0.0030	----	----	----	----
Zirconium, total	7440-67-7	E420/CG	0.00020	mg/L		<0.00020	----	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/CG	0.0010	mg/L		0.0144	----	----	----	----
Antimony, dissolved	7440-36-0	E421/CG	0.00010	mg/L		0.00011	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/CG	0.00010	mg/L		0.00052	----	----	----	----
Barium, dissolved	7440-39-3	E421/CG	0.00010	mg/L		0.0552	----	----	----	----
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		0.023	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/CG	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L		24.7	----	----	----	----
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		0.00170	----	----	----	----
Iron, dissolved	7439-89-6	E421/CG	0.010	mg/L		<0.010	----	----	----	----
Lead, dissolved	7439-92-1	E421/CG	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, dissolved	7439-93-2	E421/CG	0.0010	mg/L		0.0050	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L		5.91	----	----	----	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L		<0.00010	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/CG	0.000050	mg/L		0.000398	----	----	----	----
Nickel, dissolved	7440-02-0	E421/CG	0.00050	mg/L		0.00078	----	----	----	----
Phosphorus, dissolved	7723-14-0	E421/CG	0.050	mg/L		<0.050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L		1.54	----	----	----	----
Rubidium, dissolved	7440-17-7	E421/CG	0.00020	mg/L		0.00159	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Treated Water	----	----	----	----
					Client sampling date / time	08-Aug-2023 09:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		FC2302194-001	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
Selenium, dissolved	7782-49-2	E421/CG	0.000050	mg/L		0.000080	----	----	----	----
Silicon, dissolved	7440-21-3	E421/CG	0.050	mg/L		2.02	----	----	----	----
Silver, dissolved	7440-22-4	E421/CG	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/CG	0.050	mg/L		39.3	----	----	----	----
Strontium, dissolved	7440-24-6	E421/CG	0.00020	mg/L		0.152	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/CG	0.50	mg/L		4.12	----	----	----	----
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		<0.00030	----	----	----	----
Tungsten, dissolved	7440-33-7	E421/CG	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, dissolved	7440-61-1	E421/CG	0.000010	mg/L		<0.000010	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/CG	0.00050	mg/L		<0.00050	----	----	----	----
Zinc, dissolved	7440-66-6	E421/CG	0.0010	mg/L		<0.0010	----	----	----	----
Zirconium, dissolved	7440-67-7	E421/CG	0.00030	mg/L		<0.00030	----	----	----	----
Dissolved metals filtration location	----	EP421/CG	-	-		Laboratory	----	----	----	----
Aggregate Organics										
Naphthenic acids	----	E565-L/EO	0.10	mg/L		<0.10	----	----	----	----
Volatile Organic Compounds [BTEXS+MTBE]										
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	----	----	----	----
Hydrocarbons										
F1 (C6-C10)	----	E581.F1/CG	100	µg/L		<100	----	----	----	----
F1-BTEX	----	EC580/CG	100	µg/L		<100	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Treated Water	----	----	----	----
					Client sampling date / time	08-Aug-2023 09:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		FC2302194-001	--------	--------	--------	--------
						Result	----	----	----	----
Hydrocarbons										
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	----	----	----	----
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/CG	1.0	%		104	----	----	----	----
Dichlorotoluene, 3,4-	95-75-0	E581.F1/CG	1.0	%		108	----	----	----	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/CG	1.0	%		99.3	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	1.0	%		102	----	----	----	----
Polycyclic Aromatic Hydrocarbons										
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	----	----	----	----
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	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Treated Water	----	----	----	----
					Client sampling date / time	08-Aug-2023 09:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		FC2302194-001	--------	--------	--------	--------
						Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons										
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	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
Chrysene-d12	1719-03-5	E641A/CG	0.1	%		112	----	----	----	----
Naphthalene-d8	1146-65-2	E641A/CG	0.1	%		102	----	----	----	----
Phenanthrene-d10	1517-22-2	E641A/CG	0.1	%		88.5	----	----	----	----

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

Work Order	: **FC2302194**	Page	: 1 of 6
Client	: **Regional Municipality of Wood Buffalo**	Laboratory	: ALS Environmental - Fort McMurray
Contact	: Water Treatment Plant	Account Manager	: Megan Trydal
Address	: 1 Silin Forest Road Fort Mcmurray AB Canada T9H 5A1	Address	: #4, 340 Macalpine Crescent Fort McMurray AB Canada T9H 4A8
Telephone	: 780-762-5863	Telephone	: +1 780 791 1524
Project	: Fort Chipewyan Imperial Release	Date Samples Received	: 08-Aug-2023 15:50
PO	: 4500051416	Date Analysis Commenced	: 10-Aug-2023
C-O-C number	: ----	Issue Date	: 12-Aug-2023 12:01
Sampler	: DF, DM		
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.

Signatories	*Position*	*Laboratory Department*
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
Kate Dimitrova	Analsyt	Inorganics, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Nguyen Tran	Laboratory Analyst	Organics, Calgary, Alberta
Victoria Piguing	Laboratory Analyst	Organics, Calgary, Alberta

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.

Unit	*Description*
-	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

FC2302194-001

Sub-Matrix: **Water**
(Matrix: **Water**)

Client sample ID: Treated Water
Client sampling date / time: 08-Aug-2023 09:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, bicarbonate (as HCO3)	71-52-3	120	1.0	mg/L	E290/CG	10-Aug-2023	10-Aug-2023	1079013
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/CG	10-Aug-2023	10-Aug-2023	1079013
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/CG	10-Aug-2023	10-Aug-2023	1079013
Alkalinity, total (as CaCO3)	----	98.1	1.0	mg/L	E290/CG	10-Aug-2023	10-Aug-2023	1079013
Conductivity	----	350	1.0	µS/cm	E100/CG	10-Aug-2023	10-Aug-2023	1079012
Hardness (as CaCO3), dissolved	----	86.0	0.50	mg/L	EC100/CG	-	10-Aug-2023	-
Hardness (as CaCO3), from total Ca/Mg	----	86.3	0.50	mg/L	EC100A/CG	-	10-Aug-2023	-
pH	----	7.94	0.10	pH units	E108/CG	10-Aug-2023	10-Aug-2023	1079014
Salinity	----	<1.0	1.0	psu	EC100S/VA	-	11-Aug-2023	-
Solids, total dissolved [TDS], calculated	----	197	1.0	mg/L	EC103/CG	-	10-Aug-2023	-
Anions and Nutrients								
Chloride	16887-00-6	50.1	0.50	mg/L	E235.Cl/CG	10-Aug-2023	10-Aug-2023	1078314
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/CG	10-Aug-2023	10-Aug-2023	1078313
Nitrate (as N)	14797-55-8	0.085	0.020	mg/L	E235.NO3/CG	10-Aug-2023	10-Aug-2023	1078310
Nitrate + Nitrite (as N)	----	0.0850	0.03	mg/L	EC235.N+N/CG	-	10-Aug-2023	1078618
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/CG	10-Aug-2023	10-Aug-2023	1078312
Sulfate (as SO4)	14808-79-8	11.0	0.30	mg/L	E235.SO4/CG	10-Aug-2023	10-Aug-2023	1078311
Total Sulfides								
Sulfide, total (as S)	18496-25-8	0.0024	0.0015	mg/L	E395/VA	-	11-Aug-2023	1080836
Ion Balance								
Anion sum	----	3.61	0.10	meq/L	EC101/CG	-	10-Aug-2023	-
Cation sum	----	3.47	0.10	meq/L	EC101/CG	-	10-Aug-2023	-
Ion balance (APHA)	----	-1.98	0.01	%	EC101/CG	-	10-Aug-2023	-
Ion balance (cations/anions)	----	96.1	0.010	%	EC101/CG	-	10-Aug-2023	-
Total Metals								
Aluminum, total	7429-90-5	0.0154	0.0030	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Antimony, total	7440-36-0	0.00011	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Arsenic, total	7440-38-2	0.00050	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Barium, total	7440-39-3	0.0529	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Beryllium, total	7440-41-7	<0.000020	0.000020	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Bismuth, total	7440-69-9	<0.000050	0.000050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Boron, total	7440-42-8	0.024	0.010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Cadmium, total	7440-43-9	0.0000056	0.0000050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Calcium, total	7440-70-2	24.9	0.050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Cesium, total	7440-46-2	<0.000010	0.000010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Chromium, total	7440-47-3	<0.00050	0.00050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Cobalt, total	7440-48-4	<0.00010	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Copper, total	7440-50-8	0.00239	0.00050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Iron, total	7439-89-6	<0.010	0.010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Lead, total	7439-92-1	<0.000050	0.000050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Lithium, total	7439-93-2	0.0046	0.0010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Magnesium, total	7439-95-4	5.87	0.0050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Manganese, total	7439-96-5	0.0180	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Molybdenum, total	7439-98-7	0.000350	0.000050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Nickel, total	7440-02-0	0.00103	0.00050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427

Analytical Results

FC2302194-001

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: Treated Water
Client sampling date / time: 08-Aug-2023 09:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Total Metals								
Phosphorus, total	7723-14-0	<0.050	0.050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Potassium, total	7440-09-7	1.50	0.050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Rubidium, total	7440-17-7	0.00175	0.00020	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Selenium, total	7782-49-2	0.000064	0.000050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Silicon, total	7440-21-3	1.98	0.10	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Silver, total	7440-22-4	<0.000010	0.000010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Sodium, total	7440-23-5	39.5	0.050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Strontium, total	7440-24-6	0.148	0.00020	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Sulfur, total	7704-34-9	4.18	0.50	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Tellurium, total	13494-80-9	<0.00020	0.00020	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Thallium, total	7440-28-0	<0.000010	0.000010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Thorium, total	7440-29-1	<0.00010	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Tin, total	7440-31-5	<0.00010	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Titanium, total	7440-32-6	<0.00030	0.00030	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Tungsten, total	7440-33-7	<0.00010	0.00010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Uranium, total	7440-61-1	<0.000010	0.000010	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Vanadium, total	7440-62-2	<0.00050	0.00050	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Zinc, total	7440-66-6	<0.0030	0.0030	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Zirconium, total	7440-67-7	<0.00020	0.00020	mg/L	E420/CG	10-Aug-2023	10-Aug-2023	1078427
Dissolved Metals								
Aluminum, dissolved	7429-90-5	0.0144	0.0010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Antimony, dissolved	7440-36-0	0.00011	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Arsenic, dissolved	7440-38-2	0.00052	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Barium, dissolved	7440-39-3	0.0552	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Beryllium, dissolved	7440-41-7	<0.000020	0.000020	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Bismuth, dissolved	7440-69-9	<0.000050	0.000050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Boron, dissolved	7440-42-8	0.023	0.010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Cadmium, dissolved	7440-43-9	<0.0000050	0.0000050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Calcium, dissolved	7440-70-2	24.7	0.050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Cesium, dissolved	7440-46-2	<0.000010	0.000010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Chromium, dissolved	7440-47-3	<0.00050	0.00050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Cobalt, dissolved	7440-48-4	<0.00010	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Copper, dissolved	7440-50-8	0.00170	0.00020	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Iron, dissolved	7439-89-6	<0.010	0.010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Lead, dissolved	7439-92-1	<0.000050	0.000050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Lithium, dissolved	7439-93-2	0.0050	0.0010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Magnesium, dissolved	7439-95-4	5.91	0.0050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Manganese, dissolved	7439-96-5	<0.00010	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Molybdenum, dissolved	7439-98-7	0.000398	0.000050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Nickel, dissolved	7440-02-0	0.00078	0.00050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Phosphorus, dissolved	7723-14-0	<0.050	0.050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Potassium, dissolved	7440-09-7	1.54	0.050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Rubidium, dissolved	7440-17-7	0.00159	0.00020	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Selenium, dissolved	7782-49-2	0.000080	0.000050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Silicon, dissolved	7440-21-3	2.02	0.050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426

Analytical Results

FC2302194-001

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: Treated Water
Client sampling date / time: 08-Aug-2023 09:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Silver, dissolved	7440-22-4	<0.000010	0.000010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Sodium, dissolved	7440-23-5	39.3	0.050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Strontium, dissolved	7440-24-6	0.152	0.00020	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Sulfur, dissolved	7704-34-9	4.12	0.50	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Tellurium, dissolved	13494-80-9	<0.00020	0.00020	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Thallium, dissolved	7440-28-0	<0.000010	0.000010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Thorium, dissolved	7440-29-1	<0.00010	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Tin, dissolved	7440-31-5	<0.00010	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Titanium, dissolved	7440-32-6	<0.00030	0.00030	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Tungsten, dissolved	7440-33-7	<0.00010	0.00010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Uranium, dissolved	7440-61-1	<0.000010	0.000010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Vanadium, dissolved	7440-62-2	<0.00050	0.00050	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Zinc, dissolved	7440-66-6	<0.0010	0.0010	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Zirconium, dissolved	7440-67-7	<0.00030	0.00030	mg/L	E421/CG	10-Aug-2023	10-Aug-2023	1078426
Dissolved metals filtration location	----	Laboratory	-	-	EP421/CG	-	10-Aug-2023	1078426
Aggregate Organics								
Naphthenic acids	----	<0.10	0.10	mg/L	E565-L/EO	10-Aug-2023	10-Aug-2023	1078432
Volatile Organic Compounds [BTEXS+MTBE]								
Benzene	71-43-2	<0.50	0.50	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Ethylbenzene	100-41-4	<0.50	0.50	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Toluene	108-88-3	<0.50	0.50	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Xylene, m+p-	179601-23-1	<0.50	0.50	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Xylene, o-	95-47-6	<0.50	0.50	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Xylenes, total	1330-20-7	<0.75	0.75	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
BTEX, total	----	<1.2	1.2	µg/L	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Hydrocarbons								
F1 (C6-C10)	----	<100	100	µg/L	E581.F1/CG	10-Aug-2023	10-Aug-2023	1078207
F1-BTEX	----	<100	100	µg/L	EC580/CG	-	10-Aug-2023	-
F2 (C10-C16)	----	<100	100	µg/L	E601/CG	10-Aug-2023	10-Aug-2023	1078287
F3 (C16-C34)	----	<250	250	µg/L	E601/CG	10-Aug-2023	10-Aug-2023	1078287
F4 (C34-C50)	----	<250	250	µg/L	E601/CG	10-Aug-2023	10-Aug-2023	1078287
Hydrocarbons, total (C6-C50)	----	<400	400	µg/L	EC581/CG	-	10-Aug-2023	-
Hydrocarbons Surrogates								
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	104	1.0	%	E601/CG	10-Aug-2023	10-Aug-2023	1078287
Dichlorotoluene, 3,4-	95-75-0	108	1.0	%	E581.F1/CG	10-Aug-2023	10-Aug-2023	1078207
Volatile Organic Compounds Surrogates								
Bromofluorobenzene, 4-	460-00-4	99.3	1.0	%	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Difluorobenzene, 1,4-	540-36-3	102	1.0	%	E611A/CG	10-Aug-2023	10-Aug-2023	1078208
Polycyclic Aromatic Hydrocarbons								
Acenaphthene	83-32-9	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Acenaphthylene	208-96-8	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Acridine	260-94-6	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Anthracene	120-12-7	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Benz(a)anthracene	56-55-3	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Benzo(a)pyrene	50-32-8	<0.0050	0.0050	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288

Analytical Results

FC2302194-001

Sub-Matrix: **Water**
(Matrix: **Water**)

Client sample ID: Treated Water
Client sampling date / time: 08-Aug-2023 09:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Polycyclic Aromatic Hydrocarbons								
Benzo(b+j)fluoranthene	n/a	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Benzo(b+j+k)fluoranthene	n/a	<0.015	0.015	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Benzo(g,h,i)perylene	191-24-2	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Benzo(k)fluoranthene	207-08-9	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Chrysene	218-01-9	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Dibenz(a,h)anthracene	53-70-3	<0.0050	0.0050	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Fluoranthene	206-44-0	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Fluorene	86-73-7	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Indeno(1,2,3-c,d)pyrene	193-39-5	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Methylnaphthalene, 1-	90-12-0	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Methylnaphthalene, 1+2-	----	<0.015	0.015	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Methylnaphthalene, 2-	91-57-6	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Naphthalene	91-20-3	<0.050	0.050	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Phenanthrene	85-01-8	<0.020	0.020	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Pyrene	129-00-0	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Quinoline	91-22-5	<0.050	0.050	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
B(a)P total potency equivalents [B(a)P TPE]	----	<0.010	0.010	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
PAHs, high molecular weight (BC AWQ)	n/a	<0.030	0.03	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
PAHs, low molecular weight (BC AWQ)	n/a	<0.060	0.06	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
PAHs, total (CCME sewer 18)	n/a	<0.070	0.07	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
PAHs, total (EPA 16)	n/a	<0.065	0.065	µg/L	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Polycyclic Aromatic Hydrocarbons Surrogates								
Chrysene-d12	1719-03-5	112	0.1	%	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Naphthalene-d8	1146-65-2	102	0.1	%	E641A/CG	10-Aug-2023	10-Aug-2023	1078288
Phenanthrene-d10	1517-22-2	88.5	0.1	%	E641A/CG	10-Aug-2023	10-Aug-2023	1078288

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.