CERTIFICATE OF ANALYSIS

Work Order	: **FC2302706**	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	: 20-Sep-2023 16:00
PO	: 4500051416	Date Analysis Commenced	: 21-Sep-2023
C-O-C number	: ----	Issue Date	: 26-Sep-2023 12:22
Sampler	: Darvin M./Desmond F.		
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
Katarzyna Glinka	Analyst	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Baxter	Team Leader - Inorganics	Metals, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Maqsood UlHassan	Laboratory Analyst	Organics, 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).

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 Water Treatment Plant	----	----	----	----
					Client sampling date / time: 20-Sep-2023 09:00	----	----	----	----
					FC2302706-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/CG	1.0	mg/L	108	----	----	----	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/CG	1.0	mg/L	1.9	----	----	----	----
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	92.1	----	----	----	----
Conductivity	----	E100/CG	1.0	µS/cm	345	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/CG	0.50	mg/L	76.9	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/CG	0.50	mg/L	80.0	----	----	----	----
pH	----	E108/CG	0.10	pH units	8.34	----	----	----	----
Salinity	----	EC100S/VA	1.0	psu	<1.0	----	----	----	----
Solids, total dissolved [TDS], calculated	----	EC103/CG	1.0	mg/L	189	----	----	----	----
Anions and Nutrients									
Chloride	16887-00-6	E235.Cl/CG	0.50	mg/L	48.2	----	----	----	----
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	0.047	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/CG	0.0300	mg/L	0.0470	----	----	----	----
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	<0.0015	----	----	----	----
Ion Balance									
Anion sum	----	EC101/CG	0.10	meq/L	3.43	----	----	----	----
Cation sum	----	EC101/CG	0.10	meq/L	3.32	----	----	----	----
Ion balance (APHA)	----	EC101/CG	0.01	%	-1.63	----	----	----	----
Ion balance (cations/anions)	----	EC101/CG	0.010	%	96.8	----	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/CG	0.0030	mg/L	0.0363	----	----	----	----
Antimony, total	7440-36-0	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 Water Treatment Plant	----	----	----	----
					Client sampling date / time	20-Sep-2023 09:00	----	----	----	----
						FC2302706-001	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
Arsenic, total	7440-38-2	E420/CG	0.00010	mg/L		0.00041	----	----	----	----
Barium, total	7440-39-3	E420/CG	0.00010	mg/L		0.0470	----	----	----	----
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		0.023	----	----	----	----
Cadmium, total	7440-43-9	E420/CG	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, total	7440-70-2	E420/CG	0.050	mg/L		22.0	----	----	----	----
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		0.00124	----	----	----	----
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		0.0048	----	----	----	----
Magnesium, total	7439-95-4	E420/CG	0.0050	mg/L		6.10	----	----	----	----
Manganese, total	7439-96-5	E420/CG	0.00010	mg/L		0.00330	----	----	----	----
Molybdenum, total	7439-98-7	E420/CG	0.000050	mg/L		0.000318	----	----	----	----
Nickel, total	7440-02-0	E420/CG	0.00050	mg/L		0.00068	----	----	----	----
Phosphorus, total	7723-14-0	E420/CG	0.050	mg/L		<0.050	----	----	----	----
Potassium, total	7440-09-7	E420/CG	0.050	mg/L		1.36	----	----	----	----
Rubidium, total	7440-17-7	E420/CG	0.00020	mg/L		0.00150	----	----	----	----
Selenium, total	7782-49-2	E420/CG	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, total	7440-21-3	E420/CG	0.10	mg/L		2.05	----	----	----	----
Silver, total	7440-22-4	E420/CG	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/CG	0.050	mg/L		41.0	----	----	----	----
Strontium, total	7440-24-6	E420/CG	0.00020	mg/L		0.140	----	----	----	----
Sulfur, total	7704-34-9	E420/CG	0.50	mg/L		4.36	----	----	----	----
Tellurium, total	13494-80-9	E420/CG	0.00020	mg/L		<0.00020	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Treated Water Water Treatment Plant	----	----	----	----
					Client sampling date / time	20-Sep-2023 09:00	----	----	----	----
						FC2302706-001	--------	--------	--------	--------
						Result	----	----	----	----
Total Metals										
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	----	----	----	----
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		0.0205	----	----	----	----
Antimony, dissolved	7440-36-0	E421/CG	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/CG	0.00010	mg/L		0.00037	----	----	----	----
Barium, dissolved	7440-39-3	E421/CG	0.00010	mg/L		0.0452	----	----	----	----
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		0.021	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/CG	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, dissolved	7440-70-2	E421/CG	0.050	mg/L		21.2	----	----	----	----
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		0.00108	----	----	----	----
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		0.0047	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/CG	0.0050	mg/L		5.83	----	----	----	----
Manganese, dissolved	7439-96-5	E421/CG	0.00010	mg/L		0.00041	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Treated Water Water Treatment Plant	----	----	----	----
					Client sampling date / time	20-Sep-2023 09:00	----	----	----	----
					FC2302706-001	--------	--------	--------	--------	--------
					Result	----	----	----	----	----
Dissolved Metals										
Molybdenum, dissolved	7439-98-7	E421/CG	0.000050	mg/L	0.000333	----	----	----	----	
Nickel, dissolved	7440-02-0	E421/CG	0.00050	mg/L	0.00066	----	----	----	----	
Phosphorus, dissolved	7723-14-0	E421/CG	0.050	mg/L	<0.050	----	----	----	----	
Potassium, dissolved	7440-09-7	E421/CG	0.050	mg/L	1.38	----	----	----	----	
Rubidium, dissolved	7440-17-7	E421/CG	0.00020	mg/L	0.00143	----	----	----	----	
Selenium, dissolved	7782-49-2	E421/CG	0.000050	mg/L	0.000054	----	----	----	----	
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	40.2	----	----	----	----	
Strontium, dissolved	7440-24-6	E421/CG	0.00020	mg/L	0.136	----	----	----	----	
Sulfur, dissolved	7704-34-9	E421/CG	0.50	mg/L	4.22	----	----	----	----	
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	----	----	----	----	

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Treated Water Water Treatment Plant	----	----	----	----
					Client sampling date / time: 20-Sep-2023 09:00	----	----	----	----
					FC2302706-001	--------	--------	--------	--------
					Result	----	----	----	----
Volatile Organic Compounds [BTEXS+MTBE]									
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	----	----	----	----
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	%	102	----	----	----	----
Dichlorotoluene, 3,4-	95-75-0	E581.F1/CG	1.0	%	104	----	----	----	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	1.0	%	81.2	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	1.0	%	99.5	----	----	----	----
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	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: Treated Water Water Treatment Plant	----	----	----	----
					Client sampling date / time: 20-Sep-2023 09:00	----	----	----	----
					FC2302706-001	--------	--------	--------	--------
					Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
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	----	----	----	----
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	%	90.8	----	----	----	----
Naphthalene-d8	1146-65-2	E641A/CG	0.1	%	107	----	----	----	----
Phenanthrene-d10	1517-22-2	E641A/CG	0.1	%	82.6	----	----	----	----

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.