



August 11th, 2022

Alberta Environment and Parks
Monitoring Branch
11th Floor Oxbridge Place
9820 106 ST
Edmonton, AB T5K 2J6

Dear Sir/Madam:

Re: Industrial Runoff Report for July 2022 Approval 10348-03-01

Enclosed is the Industrial Runoff Report as required by Sections 4.3.17 and 4.3.18 of the above approval. We only discharged from pond B in July and July's discharge event occurred over 14 consecutive days, starting July 13th and ending July 26th.

The analytical results for Pond B were received from ALS Labs on July 11th reviewed by Lab Management and the General Manager and confirmed that all parameters for Pond B passed the requirements in Table 4.3-B of our approval.

July's total volume was 14,391 m³ discharged during this pumping event. We did not have any mechanical issues with the pump during this event.

There were no issues with pollution abatement or monitoring equipment.

Yours truly,
Clean Harbors Canada, Inc.

A handwritten signature in blue ink that reads "Stan Yuha".

Stan Yuha
Facility Manager

CLEAN HARBORS CANADA, LTD.						
SURFACE WATER DETENTION POND B						
DATE		PUMPING TO DISCHARGE POND C		FLOW (m3)		OIL OR OTHER SUBSTANCES
1-Jul-22		No		-		No
2-Jul-22		No		-		No
3-Jul-22		No		-		No
4-Jul-22		No		-		No
5-Jul-22		No		-		No
6-Jul-22		No		-		No
7-Jul-22		No		-		No
8-Jul-22		No		-		No
9-Jul-22		No		-		No
10-Jul-22		No		-		No
11-Jul-22		No		-		No
12-Jul-22		No		-		No
13-Jul-22		Yes		753		No
14-Jul-22		Yes		770		No
15-Jul-22		Yes		1263		No
16-Jul-22		Yes		543		No
17-Jul-22		Yes		492		No
18-Jul-22		Yes		453		No
19-Jul-22		Yes		1169		No
20-Jul-22		Yes		2883		No
21-Jul-22		Yes		1102		No
22-Jul-22		Yes		1204		No
23-Jul-22		Yes		627		No
24-Jul-22		Yes		790		No
25-Jul-22		Yes		910		No
26-Jul-22		Yes		1432		No
27-Jul-22		No		-		No
28-Jul-22		No		-		No
29-Jul-22		No		-		No
30-Jul-22		No		-		No
31-Jul-22		No		-		No
Total Volume for Pond B July 2022				14391		
Chemical Analysis	Limit	Pond B July 4th Results				
pH	6.0-9.5	8.19	unit			
Chemical Oxygen Demand	50	35	mg/L			
Total Dissolved Solids	2500	732	mg/L			
Total Suspended Solids	25	3.8	mg/L			
Ammonia, Total Dissolved (as N)	5	0.0218	mg/L			
Chloride	250	37.3	mg/L			
Sodium	200	188	mg/L			
Sulfate	500	348	mg/L			
Oil or other Substances	Negative	Negative				
Rainbow Trout	pass	pass				
Daphnia magna	pass	pass				



CERTIFICATE OF ANALYSIS

Work Order	: EO2205135	Page	: 1 of 4
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Pamela Toledo
Address	: PO Box 390, 50114 Rame Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Pond B July 4	Date Samples Received	: 04-Jul-2022 17:45
PO	: ----	Date Analysis	: 05-Jul-2022
C-O-C number	: ----	Commenced	
Sampler	: TW	Issue Date	: 11-Jul-2022 16:15
Site	: Table 4.3B		
Quote number	: Q82439 / Q82442		
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

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 FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Amanda Powell	Account Manager	External Subcontracting, Edmonton, Alberta
Angeli Marzan	Lab Analyst	Inorganics, Edmonton, Alberta
Austin Wasylshyn	Lab Analyst	Metals, Edmonton, Alberta
Jessica Maitland	Lab Assistant	Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Sobhithan Pillay		Inorganics, Edmonton, Alberta
Yan Zhang	Lab Analyst	Organics, Edmonton, 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).

<i>Unit</i>	<i>Description</i>
-	No Unit
mg/L	milligrams per litre
pH units	pH units

>: greater than.

<: less 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

EO2205135-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Pond B

Client sampling date / time: 04-Jul-2022 12:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.19	0.10	pH units	E108	05-Jul-2022	06-Jul-2022	550116
solids, total dissolved [TDS]	----	732	20	mg/L	E162	-	05-Jul-2022	549719
solids, total suspended [TSS]	----	3.8	3.0	mg/L	E160	-	05-Jul-2022	549456
Anions and Nutrients								
ammonia, total (as N)	7664-41-7	0.0218	0.0050	mg/L	E298	05-Jul-2022	05-Jul-2022	550328
chloride	16887-00-6	37.3	0.50	mg/L	E235.Cl	05-Jul-2022	06-Jul-2022	550402
sulfate (as SO4)	14808-79-8	348	0.30	mg/L	E235.SO4	05-Jul-2022	06-Jul-2022	550401
Bioassays								
trout bioassay LC50	----	See attached	-	-	TRT-LC50-96	-	11-Jul-2022	-
Total Metals								
aluminum, total	7429-90-5	0.565	0.0030	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
antimony, total	7440-36-0	0.00056	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
arsenic, total	7440-38-2	0.00259	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
barium, total	7440-39-3	0.0758	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
beryllium, total	7440-41-7	0.000034	0.000020	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
bismuth, total	7440-69-9	<0.000050	0.000050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
boron, total	7440-42-8	0.088	0.010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
cadmium, total	7440-43-9	0.0000596	0.0000050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
calcium, total	7440-70-2	38.3	0.050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
cesium, total	7440-46-2	0.000082	0.000010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
chromium, total	7440-47-3	0.00126	0.00050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
cobalt, total	7440-48-4	0.00055	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
copper, total	7440-50-8	0.0126	0.00050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
iron, total	7439-89-6	0.762	0.010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
lead, total	7439-92-1	0.000742	0.000050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
lithium, total	7439-93-2	0.0398	0.0010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
magnesium, total	7439-95-4	14.9	0.0050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
manganese, total	7439-96-5	0.0201	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
molybdenum, total	7439-98-7	0.124	0.000050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
nickel, total	7440-02-0	0.0149	0.00050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
phosphorus, total	7723-14-0	0.053	0.050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
potassium, total	7440-09-7	8.30	0.050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
rubidium, total	7440-17-7	0.00372	0.00020	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
selenium, total	7782-49-2	0.000988	0.000050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
silicon, total	7440-21-3	3.84	0.10	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
silver, total	7440-22-4	0.000015	0.000010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
sodium, total	7440-23-5	188	0.050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
strontium, total	7440-24-6	0.426	0.00020	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
sulfur, total	7704-34-9	124	0.50	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
tellurium, total	13494-80-9	<0.00020	0.00020	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
thallium, total	7440-28-0	0.000012	0.000010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
thorium, total	7440-29-1	0.00021	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
tin, total	7440-31-5	0.00014	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
titanium, total	7440-32-6	0.0122	0.00030	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
tungsten, total	7440-33-7	0.00102	0.00010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
uranium, total	7440-61-1	0.00414	0.000010	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
vanadium, total	7440-62-2	0.0265	0.00050	mg/L	E420	05-Jul-2022	05-Jul-2022	549716



Analytical Results

EO2205135-001

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Pond B

Client sampling date / time: 04-Jul-2022 12:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Total Metals								
zinc, total	7440-66-6	0.0135	0.0030	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
zirconium, total	7440-67-7	0.00126	0.00020	mg/L	E420	05-Jul-2022	05-Jul-2022	549716
Aggregate Organics								
chemical oxygen demand [COD]	----	35	10	mg/L	E559-L	-	05-Jul-2022	549390
oil & grease (visible sheen)	----	Absent	-	-	E566	-	06-Jul-2022	-

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: EO2205135	Page	: 1 of 7
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Pamela Toledo
Address	: PO Box 390, 50114 Rame Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Pond B July 4	Date Samples Received	: 04-Jul-2022 17:45
PO	: ----	Issue Date	: 11-Jul-2022 16:16
C-O-C number	: ----		
Sampler	: TW		
Site	: Table 4.3B		
Quote number	: Q82439 / Q82442		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- 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

- No Quality Control Sample Frequency Outliers occur.



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		
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)											
Amber glass total (sulfuric acid) Pond B	E559-L	04-Jul-2022	----	----	----		05-Jul-2022	28 days	1 days	✓	
Aggregate Organics : Oil & Grease by Visible Sheen											
Amber glass (hydrochloric acid) Pond B	E566	04-Jul-2022	----	----	----		06-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (sulfuric acid) Pond B	E298	04-Jul-2022	05-Jul-2022	----	----		05-Jul-2022	28 days	1 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE Pond B	E235.Cl	04-Jul-2022	----	----	----		06-Jul-2022	28 days	2 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Pond B	E235.SO4	04-Jul-2022	----	----	----		06-Jul-2022	28 days	2 days	✓	
Bioassays : Survival/LC50 Rainbow Trout (96 hours)											
LDPE carboy Pond B	TRT-LC50-96	04-Jul-2022	----	----	----		11-Jul-2022	5 days	7 days	* EHT	
Physical Tests : pH by Meter											
HDPE Pond B	E108	04-Jul-2022	----	----	----		06-Jul-2022	0.25 hrs	44 hrs	* EHTR-FM	



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : TDS by Gravimetry										
HDPE Pond B	E162	04-Jul-2022	----	----	----		05-Jul-2022	7 days	1 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Pond B	E160	04-Jul-2022	----	----	----		05-Jul-2022	7 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Pond B	E420	04-Jul-2022	----	----	----		05-Jul-2022	180 days	1 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
 EHT: Exceeded ALS recommended hold time prior to analysis.
 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	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	550328	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	549390	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	550402	1	20	5.0	5.0	✓
pH by Meter	E108	550116	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	550401	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	549719	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	549716	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	549456	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	550328	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	549390	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	550402	1	20	5.0	5.0	✓
pH by Meter	E108	550116	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	550401	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	549719	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	549716	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	549456	1	19	5.2	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	550328	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	549390	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	550402	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	550401	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	549719	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	549716	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	549456	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	550328	1	9	11.1	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	549390	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	550402	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	550401	1	16	6.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	549716	1	20	5.0	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
pH by Meter	E108 Edmonton - Environmental	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.
TSS by Gravimetry	E160 Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 Edmonton - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Edmonton - Environmental	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 Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Edmonton - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Metals in Water by CRC ICPMS	E420 Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Oil & Grease by Visible Sheen	E566 Edmonton - Environmental	Water	Alberta Energy Regulator, Drilling waste Management, Directive 050, July 2016	Use a qualitative visual observation of rainbow sheen to determine the presence or absence of oil and grease on water.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Survival/LC50 Rainbow Trout (96 hours)	TRT-LC50-96 Bureau Veritas (Edmonton) - 9331 - 48th Street Edmonton Alberta Canada T6B 2R4	Water	EPS1/RM/13	See attached report.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Edmonton - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



QUALITY CONTROL REPORT

Work Order	: EO2205135	Page	: 1 of 10
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Pamela Toledo
Address	: PO Box 390, 50114 Rame Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Pond B July 4	Date Samples Received	: 04-Jul-2022 17:45
PO	: ----	Date Analysis Commenced	: 05-Jul-2022
C-O-C number	: ----	Issue Date	: 11-Jul-2022 16:16
Sampler	: TW		
Site	: Table 4.3B		
Quote number	: Q82439 / Q82442		
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 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.

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Work Order : EO2205135
Client : Clean Harbors Environmental Services, Inc.
Project : Pond B July 4



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 549456)											
EO2205048-010	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	31.4	27.6	3.8	Diff <2x LOR	----
Physical Tests (QC Lot: 549719)											
EO2205092-001	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	154	148	6	Diff <2x LOR	----
Physical Tests (QC Lot: 550116)											
EO2205134-002	Anonymous	pH	----	E108	0.10	pH units	8.18	8.13	0.613%	3%	----
Anions and Nutrients (QC Lot: 550328)											
EO2205135-001	Pond B	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0218	0.0213	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 550401)											
FC2201472-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	74.4	74.2	0.318%	20%	----
Anions and Nutrients (QC Lot: 550402)											
FC2201472-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	52.9	52.4	1.08%	20%	----
Total Metals (QC Lot: 549716)											
EO2204958-001	Anonymous	aluminum, total	7429-90-5	E420	0.0600	mg/L	26.8	25.2	5.78%	20%	----
		antimony, total	7440-36-0	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00200	mg/L	0.0161	0.0156	0.00051	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00200	mg/L	0.680	0.640	5.98%	20%	----
		beryllium, total	7440-41-7	E420	0.000400	mg/L	0.00280	0.00287	0.000067	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.200	mg/L	0.500	0.503	0.003	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.000100	mg/L	0.000713	0.000679	0.0000342	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	1.00	mg/L	45.1	44.2	2.08%	20%	----
		cesium, total	7440-46-2	E420	0.000200	mg/L	0.00267	0.00249	6.86%	20%	----
		chromium, total	7440-47-3	E420	0.0100	mg/L	0.0296	0.0284	0.00118	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00200	mg/L	0.0179	0.0171	0.00081	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.0100	mg/L	0.0678	0.0649	0.00296	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.200	mg/L	20.2	18.8	7.10%	20%	----
		lead, total	7439-92-1	E420	0.00100	mg/L	0.0188	0.0180	4.39%	20%	----
		lithium, total	7439-93-2	E420	0.0200	mg/L	0.0955	0.0895	0.0060	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	13.7	12.9	5.80%	20%	----
		manganese, total	7439-96-5	E420	0.00200	mg/L	0.422	0.412	2.45%	20%	----
		molybdenum, total	7439-98-7	E420	0.00100	mg/L	0.00117	0.00117	0.000003	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 549716) - continued											
EO2204958-001	Anonymous	nickel, total	7440-02-0	E420	0.0100	mg/L	0.0769	0.0731	0.00384	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	1.00	mg/L	10.4	10.1	3.83%	20%	----
		rubidium, total	7440-17-7	E420	0.00400	mg/L	0.0310	0.0293	0.00172	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.00100	mg/L	<0.00100	0.00100	0.000004	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	2.00	mg/L	66.3	64.4	3.01%	20%	----
		silver, total	7440-22-4	E420	0.000200	mg/L	0.000301	0.000261	0.000039	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	1.00	mg/L	202	202	0.215%	20%	----
		strontium, total	7440-24-6	E420	0.00400	mg/L	0.751	0.738	1.83%	20%	----
		sulfur, total	7704-34-9	E420	10.0	mg/L	62.1	63.8	1.72	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00400	mg/L	<0.00400	<0.00400	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000200	mg/L	0.000384	0.000304	0.000080	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00200	mg/L	0.00300	0.00328	0.00028	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00600	mg/L	0.178	0.147	19.2%	20%	----
		tungsten, total	7440-33-7	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000200	mg/L	0.00394	0.00374	5.14%	20%	----
		vanadium, total	7440-62-2	E420	0.0100	mg/L	0.0549	0.0508	0.00405	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0600	mg/L	0.182	0.172	0.0104	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00400	mg/L	0.0273	0.0275	0.00024	Diff <2x LOR	----
Aggregate Organics (QC Lot: 549390)											
EO2205003-004	Anonymous	chemical oxygen demand [COD]	----	E559-L	100	mg/L	8300	8650	4.24%	20%	----



Method Blank (MB) Report

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

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 549456)						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 549719)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 550328)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 550401)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 550402)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Total Metals (QCLot: 549716)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 549716) - continued						
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	----
Aggregate Organics (QCLot: 549390)						
chemical oxygen demand [COD]	----	E559-L	10	mg/L	<10	----



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	
Physical Tests (QCLot: 549456)									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	93.3	85.0	115	----
Physical Tests (QCLot: 549719)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	94.0	85.0	115	----
Physical Tests (QCLot: 550116)									
pH	----	E108	----	pH units	6 pH units	102	97.0	103	----
Anions and Nutrients (QCLot: 550328)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 550401)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	108	90.0	110	----
Anions and Nutrients (QCLot: 550402)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Total Metals (QCLot: 549716)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	110	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	111	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.4	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	89.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	107	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	99.2	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	109	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	109	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	108	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Total Metals (QCLot: 549716) - continued									
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	104	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	109	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	97.7	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	99.0	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.1	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.6	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.3	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	103	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	92.5	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	105	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	106	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	97.1	80.0	120	----
Aggregate Organics (QCLot: 549390)									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	91.6	85.0	115	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 550328)										
EO2205149-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0959 mg/L	0.1 mg/L	95.9	75.0	125	----
Anions and Nutrients (QCLot: 550401)										
FC2201472-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	112 mg/L	100 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 550402)										
FC2201472-001	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Total Metals (QCLot: 549716)										
EO2204958-002	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0229 mg/L	0.02 mg/L	114	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0223 mg/L	0.02 mg/L	112	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0441 mg/L	0.04 mg/L	110	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00988 mg/L	0.01 mg/L	98.8	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00444 mg/L	0.004 mg/L	111	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0113 mg/L	0.01 mg/L	113	70.0	130	----
		chromium, total	7440-47-3	E420	0.0454 mg/L	0.04 mg/L	114	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0222 mg/L	0.02 mg/L	111	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		lithium, total	7439-93-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		nickel, total	7440-02-0	E420	0.0446 mg/L	0.04 mg/L	112	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.7 mg/L	10 mg/L	107	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0224 mg/L	0.02 mg/L	112	70.0	130	----
		selenium, total	7782-49-2	E420	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00424 mg/L	0.004 mg/L	106	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Total Metals (QCLot: 549716) - continued										
EO2204958-002	Anonymous	sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0431 mg/L	0.04 mg/L	108	70.0	130	----
		thallium, total	7440-28-0	E420	0.00384 mg/L	0.004 mg/L	96.0	70.0	130	----
		thorium, total	7440-29-1	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		tin, total	7440-31-5	E420	0.0225 mg/L	0.02 mg/L	112	70.0	130	----
		titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		uranium, total	7440-61-1	E420	0.00415 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, total	7440-62-2	E420	0.113 mg/L	0.1 mg/L	113	70.0	130	----
		zinc, total	7440-66-6	E420	0.418 mg/L	0.4 mg/L	104	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
Aggregate Organics (QCLot: 549390)										
EO2205003-005	Anonymous	chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----



RESULTS OF DAPHNIA MAGNA LC50 MULTI-CONCENTRATION

BUREAU VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2205135

Job Number: C247502
Sample Number: AWM114-02

Test Result:

48 hrs LC50 % vol/vol (95% CL): >100% (N/A) Statistical Method: Visual

Sample Name : POND B
Description: Yellow, clear
Sample Collected: Jul 04, 2022 12:00 PM
Sample Collected By: N/A
Sample Received: Jul 05, 2022 09:50 AM
Analysis Start : Jul 05, 2022 11:02 AM
End : Jul 07, 2022 10:10 AM
Sample Matrix : Water
Sample Prior to Analysis:
pH: 8.2
Temperature : 19 °C
Dissolved Oxygen: 7.9 mg/L
Sample Conductance: 926 µS/cm
Hardness: 160 mg CaCO3/L

Table with 13 columns: Concentration, Temperature (°C), pH (pH), Conductivity (uS/cm), Dissolved Oxygen (mg/L), Mortality (#), Mortality (%), Immobility (#), Immobility (%), Temperature (°C), pH (pH), Conductivity (uS/cm), Dissolved Oxygen (mg/L). Rows include % vol/vol (Start) and concentrations 0, 6.25, 12.5, 25, 50, 100.

Table with 5 columns: Concentration, Mortality (#), Mortality (%), Immobility (#), Immobility (%). Rows include % vol/vol (48 hrs) and concentrations 0, 6.25, 12.5, 25, 50, 100.

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO3 Other parameters available on request.

Test Conditions
Test concentration : 0,6.25,12.5,25,50,100 (% vol/vol)
Organisms per Vessel : 10
Pre-aeration Time : 0 min
Rate of Pre-aeration : 25-50 mL/min/L
Total # of Organisms Used : 60
Test Temperature : 20 ± 2 °C
Test Hardness Adjusted : No
Test Volume : 150 mL
Vessel Volume : 225 mL
Test pH Adjusted: No
Loading Density : 15.0 mL/Daphnia
Photoperiod : 16:8 (light: dark)

Test Organism : Daphnia magna
Source : In House Culture
Age at Test Initiation : <24 hrs
Average Brood Size : 28.5
Culture Photoperiod : 16:8 (light: dark)
% Mortality within 7 days : 1.6
Culture Temperature : 20 ± 2 °C
Time To First Brood : 7 Days
Culture Diet : Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.



RESULTS OF DAPHNIA MAGNA LC50 MULTI-CONCENTRATION

BUREAU VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2205135

Job Number: C247502
Sample Number: AWM114-02

Reference chemical: Sodium Chloride
Test Date: Jul 01, 2022
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.17 (5.50, 6.93)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.19 (4.60, 8.31) g/L
Concentration : 0,1.71,2.56,3.82,5.7,8.5 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation, including the toxicity parameters reported herein. The conductivity, dissolved oxygen and pH data contained within the toxicity report are provided for information purposes and are not individually accredited parameters. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Chelsea Tessier, Natasha Lloyd

[Handwritten signature]

Verified By : Cara Shurgot, Analyst 2

Date: Jul 08, 2022 02:16 PM



RESULTS OF RAINBOW TROUT LC50 MULTI-CONCENTRATION

BUREAU
VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number : EO2205135

Job Number: C247502

Test Result:

96 hrs LC50 % vol/vol (95% CL): >100% (N/A) Statistical Method: Visual

Sample Name :	POND B	Sample Matrix :	Water
Description:	Yellow, clear	Sample Number:	AWM114-01
Sample Collected:	Jul 04, 2022 12:00 PM	Sampling Method :	N/A
Sample Collected By:	N/A	Volume Received:	40 L
Sample Received:	Jul 05, 2022 09:50 AM	pH:	7.9
Analysis Start :	Jul 05, 2022 11:50 AM	Temperature :	14 °C
		Avg Temp Arrival:	7 °C
		Storage:	2-6°C
		Dissolved Oxygen:	8.4 mg/L
		Sample Conductance:	827 µS/cm

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)	Atypical Behaviour (%)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)	Atypical Behaviour (%)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hrs	48 hrs	48 hrs
0	15	8.0	355	9.1	0	0	0	0	0	0	0	0
6.25	15	8.0	386	9.1	0	0	0	0	0	0	0	0
12.5	14	7.8	429	9.2	0	0	0	0	0	0	0	0
25	14	8.0	484	9.1	0	0	0	0	0	0	0	0
50	14	7.9	608	9.0	0	0	0	0	0	0	0	0
100	14	7.9	838	9.2	0	0	0	0	0	0	0	0

Concentration	Mortality (#)	Mortality (%)	Atypical Behaviour (#)	Atypical Behaviour (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)	Atypical Behaviour (%)
% vol/vol	72 hrs	72 hrs	72 hrs	72 hrs	96 hrs	96 hr	96 hrs	96 hrs	96 hrs	96 hrs	96 hrs	96 hrs
0	0	0	0	0	15	7.9	354	8.8	0	0	0	0
6.25	0	0	0	0	15	8.0	382	8.8	0	0	0	0
12.5	0	0	0	0	15	8.0	430	8.7	0	0	0	0
25	0	0	0	0	15	8.0	488	8.7	0	0	0	0
50	0	0	0	0	15	7.8	615	7.6	0	0	0	0
100	0	0	0	0	15	8.1	846	8.6	0	0	0	0

Comments : None

Culture/Control/Dilution Water

City of Edmonton dechlorinated tap water

Hardness:

190 mg/L CaCO₃

Other parameters available on request.

Test Conditions

Test concentration : 0,6.25,12.5,25,50,100 (% vol/vol)

Organisms per Vessel :	10	Test Temperature :	15 ± 1 °C	Solution Depth :	>15 cm
Total # of Organisms Used :	60	Pre-aeration Time :	30 min.	Rate of Aeration	6.5±1 mL/min/L
Test Volume :	20 L	Vessel Volume :	38L	Test pH Adjusted:	No
Loading Density :	0.3 g/L	Photoperiod :	16:8 (light: dark)		

Test Organism :

Rainbow Trout (*Oncorhynchus mykiss*) Source : Spring Valley Trout Hatchery

Culture Temperature :	15 ± 2 °C	Weight (Mean) +- SD :	0.6 ± 0.1 g	Length (Mean) +- SD :	4.24 ± 0.31 cm
Culture Water Renewal :	≥ 1.0 L/min/kg fish	Weight (Range) :	0.4 – 0.8 g	Length (Range) :	3.70 – 4.80 cm
Culture Photoperiod :	16:8 (light: dark)			% Mortality within 7 days :	0%
Feeding rate and frequency :	daily: 1-5% biomass of trout.			Acclimation Time:	>14 days

Reference chemical:

Phenol

Test Date:

Jun 28, 2022

Test Endpoint 96 hrs LC50 (95% confidence interval) :

10.4 (9.35, 11.4)mg/L

Statistical Method :

Probit

Historical Mean LC50 (warning limits) :

9.94 (8.72, 11.3) mg/L

Concentration : 0,8,10,12,15,20 mg/L



RESULTS OF RAINBOW TROUT LC50 MULTI-CONCENTRATION

BUREAU
VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2205135

Job Number: C247502
Sample Number: AWM114-01

Test Method EPS 1/RM/13
Method Deviations : None

Note: The results contained in this report refer only to the testing of the sample submitted. Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation, including the toxicity parameters reported herein. The conductivity, dissolved oxygen and pH data contained within the toxicity report are provided for information purposes and are not individually accredited parameters. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Cara Shurgot, Kaylie Lyons, Kyle Monaghan

Verified By : Cara Shurgot, Analyst 2

Date: Jul 09, 2022 01:48 PM

Bureau Veritas Job Number: C247502
Report Date: 2022/07/09

ALS ENVIRONMENTAL
Client Project #: EO2205135

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AWM114	
Sampling Date		2022/07/04 12:00	
COC Number		62453	
	UNITS	POND B	QC Batch
Daphnia Magna Bioassay			
LC50	% vol/vol	ATTACHED	A633088

RDL = Reportable Detection Limit

N/A = Not Applicable

Results relate only to the items tested.



Your Project #: EO2205135
Your C.O.C. #: 62453

Attention: ALS Reporting Edmonton

ALS ENVIRONMENTAL
Bay 7, 1313 44th ave NE
CALGARY, AB
CANADA T2E 6L5

Report Date: 2022/07/09
Report #: R3197701
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C247502

Received: 2022/07/05, 09:50

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna LC50 Multi-Concentration	1	N/A	2022/07/05	EENVSOP-00154	EPS 1 RM14 2nd ed m
Rainbow Trout LC50 Multi-Concentration	1	N/A	2022/07/05	EENVSOP-00160	EPS 1 RM13 2nd ed m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.



Your Project #: EO2205135
Your C.O.C. #: 62453

Attention: ALS Reporting Edmonton

ALS ENVIRONMENTAL
Bay 7, 1313 44th ave NE
CALGARY, AB
CANADA T2E 6L5

Report Date: 2022/07/09
Report #: R3197701
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C247502

Received: 2022/07/05, 09:50

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (780) 577-7100

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For Service Group specific validation please refer to the Validation Signature Page.



**BUREAU
VERITAS**

Bureau Veritas Job #: C247502
Report Date: 2022/07/09

ALS ENVIRONMENTAL
Client Project #: EO2205135

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AWM114	
Sampling Date		2022/07/04 12:00	
COC Number		62453	
	UNITS	POND B	QC Batch
Daphnia Magna Bioassay			
LC50	% vol/vol	ATTACHED	A633088



**BUREAU
VERITAS**

Bureau Veritas Job #: C247502
Report Date: 2022/07/09

ALS ENVIRONMENTAL
Client Project #: EO2205135

TOXICOLOGY (WATER)

Bureau Veritas ID		AWM114	
Sampling Date		2022/07/04 12:00	
COC Number		62453	
	UNITS	POND B	QC Batch
Rainbow Trout Bioassay			
LC50	% vol/vol	ATTACHED	A632619



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
Package 2	6.3°C
Package 3	7.0°C
Package 4	7.3°C
Package 5	6.0°C

Results relate only to the items tested.



**BUREAU
VERITAS**

Bureau Veritas Job #: C247502
Report Date: 2022/07/09

ALS ENVIRONMENTAL
Client Project #: EO2205135

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

A handwritten signature in blue ink, appearing to read 'Cara Shurgot', written over a horizontal line.

Cara Shurgot, Analyst 2

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Chain of Custody
 Edmonton - Environmental
 9450 - 17 Avenue NW
 Edmonton AB Canada T6N 1M9

051(5)

62453



Destination Lab: **Bureau Veritas (Edmonton)**

Address: 9331 - 48th Street Edmonton AB Canada
T6B 2R4

Work Order Number: **EO2205135**

Original Receipt Date/Time: 04/07/2022 17:45
 Instructions Received

Relinquished By

Date/Time

Received By

Date/Time

Receipt Temp

Return as Indicated: Results: ALSEDClientServices@alsglobal.com Invoice: ALSEDClientServices@alsglobal.com Electronic Data: ALSEDClientServices@alsglobal.com
 Attention: Pamela Toledo

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
EO2205135-001	Pond B	Water	LDPE carboy	TRT-LC50-96	Survival/LC50 Rainbow Trout (96 hours) x 4	06-07-2022	04/07/2022 12:00	
EO2205135-001	Pond B	Water	LDPE carboy			06-07-2022	04/07/2022 12:00	
EO2205135-001	Pond B	Water	LDPE carboy			06-07-2022	04/07/2022 12:00	
EO2205135-001	Pond B	Water	LDPE carboy	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours x 2	06-07-2022	04/07/2022 12:00	
EO2205135-001	Pond B	Water	LDPE carboy			06-07-2022	04/07/2022 12:00	

P4 - Due @ 08-JUL-2022

Temp See ACTR

Deji Wu

D

2022/07/05 09:50

Job# C247502

48 hr Static Acute Lethality test using *Daphnia Magna*

PARAMETER	LIMITS
	Maximum unless otherwise indicated
pH	6.0 - 9.5 pH units
COD	50 mg/L
TDS	2500 mg/L
TSS	25 mg/L
Ammonia (expressed as Nitrogen)	5 mg/L
Chloride	250 mg/L
Sodium	200 mg/L
Sulphate	500 mg/L
Oil or other substances	Not present in amounts sufficient to create a visible film or sheen
96-Hour Multiple Concentration Acute Lethality Test Using Rainbow Trout (<i>Oncorhynchus mykiss</i>)	50% or greater survival

TABLE 4.3-B: RUNOFF LIMITS FOR SURFACE WATER DETENTION POND