



August 28th, 2023

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 2023 Approval 10348-03-01

As Per: 2.3.1 (ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater:

(A) The Standard Methods for the Examination of Water and Wastewater, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 1998, as amended.

As Per: 2.3.1 (iii) for whole effluent toxicity tests:

- (A) The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, Environment Canada, Environment Protection Series 1/RM/13, December 2000, as amended,
- (B) The Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia Magna, Environment Canada, Environment Protection Series 1/RM/13, December 2000, as amended,
- (C) The Biological Test Method: Growth Inhibition Test Using the Freshwater Alga *Selenastrum capricornutum*, Environment Canada, Environmental Protection Series, November 1992, as amended,
- (D) The Biological Test Method: Test of Reproduction and Survival Using the Cladoceran *Ceriodaphnia dubia*, Environment Canada, Environmental Protection Series 1/RM/21, February 1992, as amended,
- (E) The Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows, Environment Canada, Environmental Protection Series 1/RM/22, February 1992, as amended, and
- (F) The Biological Test Method: Toxicity Test Using Luminescent Bacteria (*Photobacterium phosphoreum*), Environment Canada, Environmental Protection Series, 1/RM/24, November 1992, as amended;

**Clean Harbors Canada, Inc. P.O. Box 390, Ryley, AB T0B 4A0
Telephone (780) 663-3828 Fax (780) 663-3539**

Enclosed is the Industrial Runoff Report as required by Sections 4.3.17 and 4.3.18 of the above approval. We discharged from both pond B and pond C in July and July's discharge event occurred over 12 days, starting July 20th and ending July 31st. We alternated discharging between the two ponds as to prevent any flooding downstream.

Samples of both ponds were submitted to ALS Labs on July 10th. The chemical analytical results for both ponds were received from ALS Labs on July 13th reviewed by Lab Management and the General Manager and confirmed that all parameters for Pond C passed the requirements in Table 4.3-B of our approval, however the sodium result for Pond B was over limit. We suspected the sodium may be an issue, so we resampled Pond B on July 12th and on July 13th as we received precipitation during these time periods. July 12th's sample was also over limit for sodium, but July 13th's sample had passed. A summary of the results is attached. The Bioassay results were received on July 19th and reviewed by the Lab Technician and Facility Operations Manager and both samples had passed. We began discharge on July 20th.

July's total volume was 25,148 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.



Stan Yuha
Facility Manager

CLEAN HARBORS CANADA, LTD.						
SURFACE WATER DETENTION PONDS B & C						
DATE	PUMPING TO DISCHARGE POND B	POND B FLOW (m3)	PUMPING TO DISCHARGE POND C	POND C FLOW (m3)	OIL OR OTHER SUBSTANCES	
1-Jul-23	No	-	No	-	No	
2-Jul-23	No	-	No	-	No	
3-Jul-23	No	-	No	-	No	
4-Jul-23	No	-	No	-	No	
5-Jul-23	No	-	No	-	No	
6-Jul-23	No	-	No	-	No	
7-Jul-23	No	-	No	-	No	
8-Jul-23	No	-	No	-	No	
9-Jul-23	No	-	No	-	No	
10-Jul-23	No	-	No	-	No	
11-Jul-23	No	-	No	-	No	
12-Jul-23	No	-	No	-	No	
13-Jul-23	No	-	No	-	No	
14-Jul-23	No	-	No	-	No	
15-Jul-23	No	-	No	-	No	
16-Jul-23	No	-	No	-	No	
17-Jul-23	No	-	No	-	No	
18-Jul-23	No	-	No	-	No	
19-Jul-23	No	-	No	-	No	
20-Jul-23	Yes	4884	No	-	No	
21-Jul-23	Yes	5402	No	-	No	
22-Jul-23	No	-	Yes	145	No	
23-Jul-23	Yes	3631	No	-	No	
24-Jul-23	No	-	Yes	133	No	
25-Jul-23	Yes	5540	No	-	No	
26-Jul-23	No	-	Yes	430	No	
27-Jul-23	No	-	Yes	525	No	
28-Jul-23	No	-	Yes	570	No	
29-Jul-23	No	-	Yes	377	No	
30-Jul-23	No	-	Yes	381	No	
31-Jul-23	Yes	3130	No	-	No	
Total Volume for Pond B July 2023		22587				
Total Volume for Pond C July 2023				2561		
Chemical Analysis	Limit	Pond B July 10th Results	Pond B July 12th Sodium Results	Pond B July 13th Sodium Results		Pond C July 10th Results
pH	6.0-9.5	8.46			unit	8.53
Chemical Oxygen Demand	50	45			mg/L	39
Total Dissolved Solids	2500	850			mg/L	778
Total Suspended Solids	25	10.6			mg/L	7
Ammonia, Total Dissolved (5	0.168			mg/L	0.0597
Chloride	250	41.3			mg/L	61.9
Sodium	200	225	227	196	mg/L	187
Sulfate	500	442			mg/L	384
Oil or other Substances	Negative	Negative				Negative
Rainbow Trout	pass	pass				pass
Daphnia magna	pass	pass				pass



CERTIFICATE OF ANALYSIS

Work Order	: EO2305939	Page	: 1 of 4
Amendment	: 1		
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range 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 and C July 10	Date Samples Received	: 10-Jul-2023 15:25
PO	: 0000234905	Date Analysis	: 11-Jul-2023
		Commenced	
C-O-C number	: ----	Issue Date	: 19-Jul-2023 10:41
Sampler	: TW		
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Amanda Powell	Account Manager	External Subcontracting, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Inorganics, 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).

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

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

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

EO2305939-001

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Pond B

Client sampling date / time: 10-Jul-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.46	0.10	pH units	E108/EO	12-Jul-2023	12-Jul-2023	1032412
Solids, total dissolved [TDS]	----	850	20	mg/L	E162/EO	-	12-Jul-2023	1032312
Solids, total suspended [TSS]	----	10.6	3.0	mg/L	E160/EO	-	12-Jul-2023	1032808
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.168	0.0050	mg/L	E298/EO	11-Jul-2023	11-Jul-2023	1033385
Chloride	16887-00-6	41.3	0.50	mg/L	E235.Cl/EO	11-Jul-2023	12-Jul-2023	1032488
Sulfate (as SO4)	14808-79-8	442	0.30	mg/L	E235.SO4/EO	11-Jul-2023	12-Jul-2023	1032489
Bioassays								
Daphnia magna LC50	----	See attached	-	-	DAP-LC50-48/3D	-	13-Jul-2023	-
Trout bioassay LC50	----	See attached	-	-	TRT-LC50-96/3D	-	13-Jul-2023	-
Total Metals								
Sodium, total	7440-23-5	225	0.050	mg/L	E420/EO	11-Jul-2023	11-Jul-2023	1032626
Aggregate Organics								
Chemical oxygen demand [COD]	----	45	10	mg/L	E559-L/EO	-	11-Jul-2023	1032504
Oil & grease (visible sheen)	----	Absent	-	-	E566/EO	-	12-Jul-2023	-

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.

Analytical Results

EO2305939-002

Sub-Matrix: Water

(Matrix: Water)

Client sample ID: Pond C

Client sampling date / time: 10-Jul-2023 09:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
pH	----	8.53	0.10	pH units	E108/EO	12-Jul-2023	12-Jul-2023	1032412
Solids, total dissolved [TDS]	----	778	20	mg/L	E162/EO	-	12-Jul-2023	1032312
Solids, total suspended [TSS]	----	7.0	3.0	mg/L	E160/EO	-	12-Jul-2023	1032808
Anions and Nutrients								
Ammonia, total (as N)	7664-41-7	0.0597	0.0050	mg/L	E298/EO	11-Jul-2023	11-Jul-2023	1033385
Chloride	16887-00-6	61.9	0.50	mg/L	E235.Cl/EO	11-Jul-2023	12-Jul-2023	1032488
Sulfate (as SO4)	14808-79-8	384	0.30	mg/L	E235.SO4/EO	11-Jul-2023	12-Jul-2023	1032489
Bioassays								
Daphnia magna LC50	----	See attached	-	-	DAP-LC50-48/3D	-	13-Jul-2023	-
Trout bioassay LC50	----	See attached	-	-	TRT-LC50-96/3D	-	13-Jul-2023	-
Total Metals								
Sodium, total	7440-23-5	187	0.050	mg/L	E420/EO	11-Jul-2023	11-Jul-2023	1032626
Aggregate Organics								
Chemical oxygen demand [COD]	----	39	10	mg/L	E559-L/EO	-	11-Jul-2023	1032504
Oil & grease (visible sheen)	----	Absent	-	-	E566/EO	-	12-Jul-2023	-



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.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2305939</p> <p>Amendment : 1</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Pond B and C July 10</p> <p>PO : 0000234905</p> <p>C-O-C number : ----</p> <p>Sampler : TW</p> <p>Site : Table 4.3B</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 2</p> <p>No. of samples analysed : 2</p>	<p>Page : 1 of 8</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 10-Jul-2023 15:25</p> <p>Issue Date : 19-Jul-2023 10:41</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

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	10-Jul-2023	----	----	----		11-Jul-2023	28 days	1 days	✔
Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)										
Amber glass total (sulfuric acid) Pond C	E559-L	10-Jul-2023	----	----	----		11-Jul-2023	28 days	1 days	✔
Aggregate Organics : Oil & Grease by Visible Sheen										
Amber glass (hydrochloric acid) Pond B	E566	10-Jul-2023	----	----	----		12-Jul-2023	28 days	2 days	✔
Aggregate Organics : Oil & Grease by Visible Sheen										
Amber glass (hydrochloric acid) Pond C	E566	10-Jul-2023	----	----	----		12-Jul-2023	28 days	2 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Pond B	E298	10-Jul-2023	11-Jul-2023	28 days	1 days	✔	11-Jul-2023	27 days	0 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Pond C	E298	10-Jul-2023	11-Jul-2023	28 days	1 days	✔	11-Jul-2023	27 days	0 days	✔
Anions and Nutrients : Chloride in Water by IC										
HDPE Pond B	E235.Cl	10-Jul-2023	11-Jul-2023	28 days	1 days	✔	12-Jul-2023	27 days	1 days	✔



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE Pond C	E235.Cl	10-Jul-2023	11-Jul-2023	28 days	1 days	✓	12-Jul-2023	27 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Pond B	E235.SO4	10-Jul-2023	11-Jul-2023	28 days	1 days	✓	12-Jul-2023	27 days	1 days	✓	
Anions and Nutrients : Sulfate in Water by IC											
HDPE Pond C	E235.SO4	10-Jul-2023	11-Jul-2023	28 days	1 days	✓	12-Jul-2023	27 days	1 days	✓	
Bioassays : Survival/LC50 Daphnia Magna 48 hours											
HDPE Pond B	DAP-LC50-48	10-Jul-2023	----	----	----		13-Jul-2023	5 days	3 days	✓	
Bioassays : Survival/LC50 Daphnia Magna 48 hours											
HDPE Pond C	DAP-LC50-48	10-Jul-2023	----	----	----		13-Jul-2023	5 days	3 days	✓	
Bioassays : Survival/LC50 Rainbow Trout (96 hours)											
LDPE carboy Pond B	TRT-LC50-96	10-Jul-2023	----	----	----		13-Jul-2023	5 days	3 days	✓	
Bioassays : Survival/LC50 Rainbow Trout (96 hours)											
LDPE carboy Pond C	TRT-LC50-96	10-Jul-2023	----	----	----		13-Jul-2023	5 days	3 days	✓	
Physical Tests : pH by Meter											
HDPE Pond B	E108	10-Jul-2023	12-Jul-2023	0.07 hrs	0.25 hrs	* EHTR-FM	12-Jul-2023	-51.45 hrs	0.07 hrs	* UCP	
Physical Tests : pH by Meter											
HDPE Pond C	E108	10-Jul-2023	12-Jul-2023	0.07 hrs	0.25 hrs	* EHTR-FM	12-Jul-2023	-51.45 hrs	0.07 hrs	* UCP	



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	10-Jul-2023	----	----	----		12-Jul-2023	7 days	2 days	✔
Physical Tests : TDS by Gravimetry										
HDPE Pond C	E162	10-Jul-2023	----	----	----		12-Jul-2023	7 days	2 days	✔
Physical Tests : TSS by Gravimetry										
HDPE Pond B	E160	10-Jul-2023	----	----	----		12-Jul-2023	7 days	2 days	✔
Physical Tests : TSS by Gravimetry										
HDPE Pond C	E160	10-Jul-2023	----	----	----		12-Jul-2023	7 days	2 days	✔
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Pond B	E420	10-Jul-2023	11-Jul-2023	180 days	1 days	✔	11-Jul-2023	179 days	0 days	✔
Total Metals : Total metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Pond C	E420	10-Jul-2023	11-Jul-2023	180 days	1 days	✔	11-Jul-2023	179 days	0 days	✔

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	1033385	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1032504	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1032488	1	11	9.0	5.0	✔
pH by Meter	E108	1032412	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1032489	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	1032312	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1032626	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	1032808	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	1033385	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1032504	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1032488	1	11	9.0	5.0	✔
pH by Meter	E108	1032412	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1032489	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	1032312	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1032626	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	1032808	1	20	5.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	1033385	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1032504	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1032488	1	11	9.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1032489	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	1032312	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1032626	1	15	6.6	5.0	✔
TSS by Gravimetry	E160	1032808	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1033385	1	20	5.0	5.0	✔
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	1032504	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1032488	1	11	9.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1032489	1	11	9.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	1032626	1	15	6.6	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Survival/LC50 Daphnia Magna 48 hours	DAP-LC50-48 Bureau Veritas (Edmonton) - 9331 - 48th Street Edmonton Alberta Canada T6B 2R4	Water	EPS1/RM/14	See attached report.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Edmonton	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
TDS by Gravimetry	E162 ALS Environmental - Edmonton	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 ALS Environmental - Edmonton	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 ALS Environmental - Edmonton	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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L ALS Environmental - Edmonton	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Oil & Grease by Visible Sheen	E566 ALS Environmental - Edmonton	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.
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 ALS Environmental - Edmonton	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

QUALITY CONTROL REPORT

Work Order	: EO2305939	Page	: 1 of 6
Amendment	: 1		
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Pond B and C July 10	Date Samples Received	: 10-Jul-2023 15:25
PO	: 0000234905	Date Analysis Commenced	: 11-Jul-2023
C-O-C number	: ----	Issue Date	: 19-Jul-2023 10:41
Sampler	: TW 780 663 2513		
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Amanda Powell	Account Manager	Bureau Veritas (Edmonton) External Subcontracting, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Edmonton Metals, Edmonton, Alberta
Geoff Berg	Lab Analyst	Edmonton Organics, Edmonton, Alberta
Leah Yee	Lab Assistant	Edmonton Inorganics, Edmonton, Alberta
Michelle Schroder	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Edmonton Inorganics, Edmonton, Alberta
Saron Gebremariam	Lab Assistant	Edmonton Inorganics, Edmonton, Alberta



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: 1032312)											
EO2305844-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	674	694	3.00%	20%	----
Physical Tests (QC Lot: 1032412)											
EO2305844-001	Anonymous	pH	----	E108	0.10	pH units	8.74	8.71	0.344%	3%	----
Physical Tests (QC Lot: 1032808)											
EO2305737-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	3.6	<3.0	0.6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1032488)											
EO2305930-006	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.12	5.13	0.117%	20%	----
Anions and Nutrients (QC Lot: 1032489)											
EO2305930-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	70.5	70.3	0.254%	20%	----
Anions and Nutrients (QC Lot: 1033385)											
FC2301815-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0125	0.0116	0.0009	Diff <2x LOR	----
Total Metals (QC Lot: 1032626)											
EO2305887-001	Anonymous	Sodium, total	7440-23-5	E420	0.050	mg/L	133	132	0.961%	20%	----
Aggregate Organics (QC Lot: 1032504)											
EO2305823-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	10	mg/L	50	47	2	Diff <2x LOR	----



Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1032312)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1032808)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1032488)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1032489)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1033385)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Total Metals (QCLot: 1032626)						
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Aggregate Organics (QCLot: 1032504)						
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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1032312)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	91.6	85.0	115	----
Physical Tests (QCLot: 1032412)									
pH	----	E108	----	pH units	6 pH units	100	97.0	103	----
Physical Tests (QCLot: 1032808)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 1032488)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 1032489)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1033385)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	105	85.0	115	----
Total Metals (QCLot: 1032626)									
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	91.6	80.0	120	----
Aggregate Organics (QCLot: 1032504)									
Chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	106	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 $\geq 1x$ 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: 1032488)										
EO2305930-006	Anonymous	Chloride	16887-00-6	E235.Cl	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1032489)										
EO2305930-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1033385)										
FC2301815-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Total Metals (QCLot: 1032626)										
EO2305887-001	Anonymous	Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
Aggregate Organics (QCLot: 1032504)										
EO2305838-001	Anonymous	Chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----



Your P.O. #: EO2305939
 Your Project #: EO2305939
 Your C.O.C. #: 126969

Attention: ALS Reporting Edmonton

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

Report Date: 2023/07/19
 Report #: R3366935
 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C351740

Received: 2023/07/11, 10:11

Sample Matrix: Water
 # Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna LC50 Multi-Concentration	2	N/A	2023/07/13	EENVSOP-00154	EPS 1 RM14 2nd ed m
Rainbow Trout LC50 Multi-concentration (1)	2	N/A	2023/07/13	BBY2SOP-00004	EPS 1/RM/13

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.

(1) This test was performed by Bureau Veritas Vancouver, 4606 Canada Way , Burnaby, BC, V5G 1K5



Your P.O. #: EO2305939
Your Project #: EO2305939
Your C.O.C. #: 126969

Attention: ALS Reporting Edmonton

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

Report Date: 2023/07/19
Report #: R3366935
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C351740

Received: 2023/07/11, 10:11

Encryption Key

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

=====

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.



**BUREAU
VERITAS**

Bureau Veritas Job #: C351740
Report Date: 2023/07/19

ALS ENVIRONMENTAL
Client Project #: EO2305939
Your P.O. #: EO2305939

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		BUG940	BUG941	
Sampling Date		2023/07/11	2023/07/11	
COC Number		126969	126969	
	UNITS	POND B	POND C	QC Batch
Daphnia Magna Bioassay				
LC50	% vol/vol	ATTACHED	ATTACHED	B032627
Rainbow Trout Bioassay				
LC50	% vol/vol	ATTACHED	ATTACHED	B033606



GENERAL COMMENTS

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

Package 1	10.0°C
Package 2	11.0°C
Package 3	11.0°C
Package 4	11.0°C
Package 5	11.7°C
Package 6	11.0°C
Package 7	11.0°C
Package 8	11.7°C
Package 9	12.0°C

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C351740
Report Date: 2023/07/19

ALS ENVIRONMENTAL
Client Project #: EO2305939
Your P.O. #: EO2305939

VALIDATION SIGNATURE PAGE

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

Natasha Lloyd, Team Lead

Navpreet Shergill, Scientist

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

C351740

126969



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

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

Work Order Number: **EO2305939**

Original Receipt Date/Time: 10/07/2023 15:25
 Instructions Received

Relinquished By

Date/Time

Received By: *AG*
AMV NAC AZEER

Date/Time: 2023/07/11 10:11

Receipt Temp: *See ACTR*

Return as Indicated: Results: ALSEDClientServices@alsglobal.com Invoice: ALSEDClientServices@alsglobal.com Electronic Data: ALSEDClientServices@alsglobal.com
 Attention: Megha Walia

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
EO2305939-001	Pond B	Water	LDPE carboy	TRT-LC50-96	Survival/LC50 Rainbow Trout (96 hours)	17-07-2023	11/07/2023 00:00	
EO2305939-001	Pond B	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-001	Pond B	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-001	Pond B	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-001	Pond B	Water	HDPE	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	17-07-2023	11/07/2023 00:00	
EO2305939-001	Pond B	Water	HDPE			17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	LDPE carboy	TRT-LC50-96	Survival/LC50 Rainbow Trout (96 hours)	17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	LDPE carboy			17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	HDPE	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	17-07-2023	11/07/2023 00:00	
EO2305939-002	Pond C	Water	HDPE			17-07-2023	11/07/2023 00:00	



RESULTS OF DAPHNIA MAGNA LC50 MULTI-CONCENTRATION

BUREAU VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2305939

Job Number: C351740
Sample Number: BUG940-02

Test Result:

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

Sample Name : POND B
Description: Pale yellow, clear
Sample Collected: Jul 11, 2023
Sample Collected By: N/A
Sample Received: Jul 11, 2023 10:11 AM
Analysis Start : Jul 13, 2023 11:28 AM
End : Jul 15, 2023 11:06 AM
Sampling Method : N/A
Site Collection: N/A
Volume Received: 1L
Avg Temp Arrival: 11 °C
Storage: 2-6°C
Sample Matrix : Water
Sample Prior to Analysis:
pH: 7.9
Temperature : 20 °C
Dissolved Oxygen: 8.5 mg/L
Sample Conductance: 1248 µS/cm
Hardness: 180 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, 0, 6.25, 12.5, 25, 50, 100.

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

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 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 : 30 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 : 200 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 : 24.3
Culture Photoperiod : 16:8 (light: dark)
% Mortality within 7 days : 3.3
Culture Temperature : 20 ± 2 °C
Time To First Brood : 8 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: EO2305939

Job Number: C351740
Sample Number: BUG940-02

Reference chemical: Sodium Chloride Test Date: Jun 29, 2023
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) : 5.75 (4.20, 7.86) 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 : Kyle Monaghan, Svetlana Sofrenovic

Verified By : Natasha Lloyd, Team Lead

Date: Jul 18, 2023 03:30 PM



RESULTS OF DAPHNIA MAGNA LC50 MULTI-CONCENTRATION

BUREAU VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2305939

Job Number: C351740
Sample Number: BUG941-02

Test Result:

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

Sample Name : POND C
Description: Clear, colorless
Sample Collected: Jul 11, 2023
Sample Collected By: N/A
Sample Received: Jul 11, 2023 10:11 AM
Analysis Start : Jul 13, 2023 10:44 AM
End : Jul 15, 2023 11:07 AM
Sample Matrix : Water
Sample Prior to Analysis:
pH: 8.0
Temperature : 20 °C
Dissolved Oxygen: 8.3 mg/L
Sample Conductance: 1111 µS/cm
Hardness: 220 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: 160 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 : 200 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 : 24.3
Culture Photoperiod : 16:8 (light: dark)
% Mortality within 7 days : 3.3
Culture Temperature : 20 ± 2 °C
Time To First Brood : 8 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: EO2305939

Job Number: C351740
Sample Number: BUG941-02

Reference chemical: Sodium Chloride Test Date: Jun 29, 2023
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) : 5.75 (4.20, 7.86) 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 : Kyle Monaghan, Svetlana Sofrenovic

Verified By : Natasha Lloyd, Team Lead

Date: Jul 18, 2023 03:32 PM



RESULTS OF RAINBOW TROUT LC50 MULTI-CONCENTRATION

BUREAU
VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2305939

Job Number: C351740

Test Result:

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

Sample Name : POND B

Description: Clear, and light yellow. Sample Number: BUG940-01
 Sample Collected: Jul 11, 2023 Sampling Method : N/A Site Collection: N/A
 Sample Collected By: N/A Volume Received: 4 x 11PAL Avg Temp Arrival: 11 °C Storage: 2-6°C
 Sample Received: Jul 11, 2023 10:11 AM pH: 8.4 Dissolved Oxygen: 9.0 mg/L
 Analysis Start : Jul 13, 2023 11:35 AM Temperature : 15 °C Sample Conductance: 1395 µS/cm

Concentration	Temperature (°C)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	pH	pH	Conductivity (uS/cm)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)
% vol/vol	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	96 hrs	96 hrs
0	14	14	10.0	10.1	8.0	7.7	54	0	0	0
6.25	14	14	10.2	10.1	8.1	7.8	180	0	0	0
12.5	14	14	10.2	10.1	8.0	7.9	256	0	0	0
25	14	14	10.1	10.0	8.2	8.0	446	0	0	0
50	15	14	9.6	10.1	8.4	8.2	871	0	0	0
100	15	14	9.5	10.0	8.4	8.4	1395	0	0	0

Comments : All fish appeared and behaved normally during the test.

Culture/Control/Dilution Water

Burnaby Municipal Dechlorinated Water

Hardness: 32 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 : 35 min. Rate of Aeration : 6.5±1 mL/min/L
 Test Volume : 15 L Vessel Volume : 20L Test pH Adjusted: No
 Loading Density : 0.4 g/L Photoperiod : 16:8 (light: dark)

Test Organism :

Rainbow Trout (*Oncorhynchus mykiss*) Source : Aqua Farm

Culture Temperature : 15 ± 2 °C Weight (Mean) +- SD : 0.5 ± 0.2 g Length (Mean) +- SD : 4.49 ± 0.76 cm
 Culture Water Renewal : ≥ 1L/min/kg fish Weight (Range) : 0.2 – 0.8 g Length (Range) : 3.10 – 5.10 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:

Zinc Test Date: Jul 04, 2023

Test Endpoint 96 hrs LC50 (95% confidence interval) : 0.15 (0.11, 0.20)mg/L Statistical Method : Probit
 Historical Mean LC50 (warning limits) : 0.19 (0.10, 0.36) mg/L Concentration : 0,0.04,0.08,0.16,0.32,0.64 mg/L

Test Method

BV Lab's BBY2SOP-00004 is based on the latest version of EPS 1/RM9 and EPS 1 /RM13.

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 : Guilherme De Faria Silva Naves, Melanie Mazziotti, Yihui (Phyllis) Fang

Verified By : Navpreet Shergill, Scientist

Date: Jul 18, 2023 06:08 PM



RESULTS OF RAINBOW TROUT LC50 MULTI-CONCENTRATION

BUREAU
VERITAS

Client : 70036 ALS ENVIRONMENTAL, CALGARY
Client Project Name & Number: EO2305939

Job Number: C351740

Test Result:

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

Sample Name : POND C

Description: Clear, and light yellow. Sample Number: BUG941-01
 Sample Collected: Jul 11, 2023 Sampling Method : N/A Site Collection: N/A
 Sample Collected By: N/A Volume Received: 4 x 11PAL Avg Temp Arrival: 11 °C Storage: 2-6°C
 Sample Received: Jul 11, 2023 10:11 AM pH: 8.5 Dissolved Oxygen: 9.2 mg/L
 Analysis Start : Jul 13, 2023 03:55 PM Temperature : 15 °C Sample Conductance: 1295 µS/cm

Concentration	Temperature (°C)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	pH	pH	Conductivity (uS/cm)	Mortality (#)	Mortality (%)	Atypical Behaviour (#)
% vol/vol	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	Initial	96 hrs	96 hrs	96 hrs
0	14	14	10.2	9.9	7.8	7.7	56	0	0	0
6.25	14	14	10.2	10.1	7.9	7.8	139	0	0	0
12.5	14	14	10.2	9.9	8.0	7.8	229	0	0	0
25	15	14	10.2	10.0	8.2	7.9	378	0	0	0
50	15	14	10.0	10.0	8.4	8.1	697	0	0	0
100	15	14	9.8	10.0	8.5	8.4	1295	0	0	0

Comments : All fish appeared and behaved normally during the test.

Culture/Control/Dilution Water

Burnaby Municipal Dechlorinated Water

Hardness: 32 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 : 15 L Vessel Volume : 20L Test pH Adjusted: No
 Loading Density : 0.4 g/L Photoperiod : 16:8 (light: dark)

Test Organism :

Rainbow Trout (*Oncorhynchus mykiss*) Source : Aqua Farm

Culture Temperature : 15 ± 2 °C Weight (Mean) +- SD : 0.6 ± 0.2 g Length (Mean) +- SD : 4.13 ± 0.43 cm
 Culture Water Renewal : ≥ 1L/min/kg fish Weight (Range) : 0.3 – 1.0 g Length (Range) : 3.40 – 4.90 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:

Zinc Test Date: Jul 04, 2023

Test Endpoint 96 hrs LC50 (95% confidence interval) : 0.15 (0.11, 0.20)mg/L Statistical Method : Probit

Historical Mean LC50 (warning limits) : 0.19 (0.10, 0.36) mg/L Concentration : 0,0.04,0.08,0.16,0.32,0.64 mg/L

Test Method

BV Lab's BBY2SOP-00004 is based on the latest version of EPS 1/RM9 and EPS 1 /RM13.

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 : Donald Lai, Guilherme De Faria Silva Naves, Melanie Mazziotti, Yihui (Phyllis) Fang

Verified By : Navpreet Shergill, Scientist

Date: Jul 18, 2023 06:12 PM

Bureau Veritas Job Number: C351740
Report Date: 2023/07/19

ALS ENVIRONMENTAL
Client Project #: EO2305939
Your P.O. #: EO2305939

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		BUG940	BUG941	
Sampling Date		7/11/2023	7/11/2023	
COC Number		126969	126969	
	UNITS	POND B	POND C	QC Batch
Daphnia Magna Bioassay				
LC50	% vol/vol	ATTACHED	ATTACHED	B032627
Rainbow Trout Bioassay				
LC50	% vol/vol	ATTACHED	ATTACHED	B033606

RDL = Reportable Detection Limit

N/A = Not Applicable

Results relate only to the items tested.



www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

COC Number: 22 -

Page of

Canada Toll Free: 1 800 668 9878

Contact and company name below will appear on the final report

Report To	Clean Harbors Canada	Reports / Recipients	Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	Turnaround Time (TAT) Requested	<input type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply <input checked="" type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum <input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum <input checked="" type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum <input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum <input type="checkbox"/> Same day [E2] if received by 10am M-5 - 200% rush surcharge.	AFFIX ALS BARCODE LABEL HERE (ALS use only)
Company:	Todd Webb, Stan Yuha	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.		
Contact:	(780) 663-2513	Company address below will appear on the final report	Invoice Recipients	Date and Time Required for all EAP TATs:	For all tests with rush TATs requested, please contact your AM to confirm availability.	
Street:	PO Box 390, 50114 Range Road 173	City/Province:	Same as Report To <input type="checkbox"/> YES <input type="checkbox"/> NO	Analysis Request		
Postal Code:	T0B 4A0	City/Province:	Copy of Invoice with Report <input type="checkbox"/> YES <input type="checkbox"/> NO	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below		
Invoice To	Same as Report To	Company:	Clean Harbors Canada	STEPHANIE DENNIS		
Company:	Clean Harbors Canada	Contact:	Stephanie Dennis	STEPHANIE DENNIS		
ALS Account # / Quote #:	EO22-CHESS100-008 (Table 4.3B)	Project Information	AFECost Center:	Oil and Gas Required Fields (client use)		
Job #:	Pond B and C July 10	ALS Contact:	Major/Minor Code:	Megha Walia		
PO / AFE:	Table 4.3B	ALS Contact:	Requisitioner:	Date (dd-mm-yy)		
LSD:	Table 4.3B	ALS Contact:	Location:	Time (hh:mm)		
ALS Lab Work Order # (ALS use only):	EO2305939	ALS Contact:		Sample Type		

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date	Time	Sample Type	NUMBER OF CONTAINERS	INDICATE FILTERED (F), PRESERVED (P) OR FILTERED AND PRESERVED (FP) BELOW	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	Pond B	10-Jul-23	9:30	Surface Water	Table 4.3B				
	Pond C	10-Jul-23	9:30	Surface Water	Trout 96 hr multi conc. Acute Lethality test				
					Daphnia 48 hr Static acute lethality test				

Drinking Water (DW) Samples¹ (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)		
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO			
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO	Please rush. Analyze as per Table 4.3B (attached), including trout and Daphnia bioassays		
SHIPMENT RELEASE (client use)	INITIAL SHIPMENT RECEPTION (ALS use only)	SAMPLE RECEIPT DETAILS (ALS use only)	
Released by: Todd Webb	Date: 10-Jul-23	Received by: PFCO	Date: 10 Jul 2023
Time: 10:00	Time: 10:00	Time: 10:15	Time: 10:15
COOLING METHOD: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED			
SUBMISSION COMMENTS IDENTIFIED ON SAMPLE RECEIPT NOTIFICATION: <input type="checkbox"/> YES <input type="checkbox"/> NO			
COOLER CUSTODY SEALS INTACT: <input type="checkbox"/> YES <input type="checkbox"/> N/A SAMPLE CUSTODY SEALS INTACT: <input type="checkbox"/> YES <input type="checkbox"/> N/A			
INITIAL COOLER TEMPERATURES °C: <input type="checkbox"/> YES <input type="checkbox"/> NO FINAL COOLER TEMPERATURES °C: <input type="checkbox"/> YES <input type="checkbox"/> NO			
FINAL SHIPMENT RECEPTION (ALS use only)			
Received by:	Date:	Time:	

Environmental Division
Edmonton
Work Order Reference
EO2305939

Telephone : +1 780 413 6227

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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



CERTIFICATE OF ANALYSIS

Work Order	: EO2306128	Page	: 1 of 2
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range 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 12 - Sodium	Date Samples Received	: 13-Jul-2023 14:00
PO	: 234905	Date Analysis	: 14-Jul-2023
C-O-C number	: ----	Commenced	
Sampler	: TW	Issue Date	: 15-Jul-2023 14:57
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
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 US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Daniel Nguyen	Lab Assistant	Metals, 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).
 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
mg/L	milligrams per litre

>: 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

EO2306128-001

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Pond B

Client sampling date / time: 12-Jul-2023 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Sodium, dissolved	7440-23-5	227	0.050	mg/L	E421/EO	14-Jul-2023	14-Jul-2023	1039257
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	14-Jul-2023	1039257

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.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2306128</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Pond B July 12 - Sodium</p> <p>PO : 234905</p> <p>C-O-C number : ----</p> <p>Sampler : TW</p> <p>Site : Table 4.3B</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 5</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 13-Jul-2023 14:00</p> <p>Issue Date : 15-Jul-2023 14:57</p>
--	---

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)

- No Analysis Holding Time Outliers exist.

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	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Pond B	E421	12-Jul-2023	14-Jul-2023	180 days	2 days	✔	14-Jul-2023	178 days	0 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Laboratory Control Samples (LCS)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Method Blanks (MB)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Matrix Spikes (MS)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	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").

<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .

QUALITY CONTROL REPORT

Work Order	: EO2306128	Page	: 1 of 3
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Pond B July 12 - Sodium	Date Samples Received	: 13-Jul-2023 14:00
PO	: 234905	Date Analysis Commenced	: 14-Jul-2023
C-O-C number	: ----	Issue Date	: 15-Jul-2023 14:57
Sampler	: TW 780 663 2513		
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Daniel Nguyen	Lab Assistant	Edmonton Metals, Edmonton, Alberta



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
Dissolved Metals (QC Lot: 1039257)											
EO2306128-001	Pond B	Sodium, dissolved	7440-23-5	E421	0.050	mg/L	227	214	5.93%	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
Dissolved Metals (QCLot: 1039257)						
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level \geq 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
Dissolved Metals (QCLot: 1039257)										
EO2306129-001	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 - Page of

Contact and company name below will appear on the final report

Report To: Clean Harbors Canada
 Company: Todd Webb, Stan Yuha
 Contact: (780) 663-2513
 Phone: Company address below will appear on the final report
 Street: PO Box 390, 50114 Range Road 173
 City/Province: Ryley, AB
 Postal Code: T0B 4A0

Select Report Format: PDF EXCEL EDD (DIGITAL)
 Merge QC/QCI Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below if box checked
 Select Distribution: EMAIL MAIL FAX
 Email 1 or Fax web: todd@cleanharbors.com
 Email 2 yuha.stan@cleanharbors.com
 Email 3

Reports / Recipients
 Select Invoice Distribution: EMAIL MAIL FAX
 Email 1 or Fax Dennis.Stephanie@cleanharbors.com
 Email 2
 Invoice Recipients
 Select Invoice Distribution: EMAIL MAIL FAX
 Email 1 or Fax Dennis.Stephanie@cleanharbors.com
 Email 2
 Oil and Gas Required Fields (client use)

Turnaround Time (TAT) Requested
 Routine [R] if received by 3pm M-F - no surcharges apply
 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
 Same day [E2] if received by 10am M-S - 200% rush surcharge.
 Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
 Date and Time Required for all E&P TATs: dd-mm-yy hh:mm am/pm
 For all tests with rush TATs requested, please contact your AM to confirm availability.

ALS Account # / Quote #: EO22-CHESS100-008 (Table 4.3B)
 Job #: Pond B July 12 - Sodium
 PO / AFE: 234905
 LSD: Table 4.3B

ALS Contact: Megha Walia
 Sampler: Todd Webb

ANALYSIS REQUEST
 Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below
 SAMPLES ON HOLD
 EXTENDED STORAGE REQUIRED
 SUSPECTED HAZARD (see notes)

ALS Sample # (ALS use only): Pond B
 Sample Identification and/or Coordinates (This description will appear on the report): Pond B

Date (dd-mm-yy)	Time (hh:mm)	Sample Type
12-Jul-23	11:00	Surface Water

NUMBER OF CONTAINERS	1	2
Dissolved Sodium		P2

Drinking Water (DW) Samples (client use)
 YES NO
 Are samples taken from a Regulated DW System?
 YES NO
 Are samples for human consumption/use?
 YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

COOLING METHOD: NONE IC
 Submission Comments identified on Sample Receipt Notification: YES NO
 Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A
 INITIAL COOLER TEMPERATURES °C: 2.7
 FINAL COOLER TEMPERATURES °C:
 SAMPLE COOLING INITIATED: YES NO
 Telephone: +1 790 413 5227

Released by: Todd Webb
 Date: 13-Jul-23
 Time: 11:30

INITIAL SHIPMENT RECEPTION (ALS use only)
 Received by: [Signature]
 Date: 13-Jul-23
 Time: 11:30

WHITE - LABORATORY COPY
 YELLOW - CLIENT COPY
 FINAL SHIPMENT RECEPTION (ALS use only)
 Received by: [Signature]
 Date: 13-Jul-23
 Time: 11:30



CERTIFICATE OF ANALYSIS

Work Order	: EO2306129	Page	: 1 of 2
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range 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 13 - Sodium	Date Samples Received	: 13-Jul-2023 14:00
PO	: 234905	Date Analysis	: 14-Jul-2023
C-O-C number	: ----	Commenced	
Sampler	: TW	Issue Date	: 15-Jul-2023 14:57
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
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 US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Daniel Nguyen	Lab Assistant	Metals, 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).
 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
mg/L	milligrams per litre

>: 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.

Accreditation

Accreditation	Description	Laboratory	Address
A	CALA ISO/IEC 17025:2017	EO ALS Environmental - Edmonton	9450 - 17 Avenue NW, Edmonton, AB

Applicable accreditations are indicated in the Method/Lab column as superscripts.

Analytical Results

EO2306129-001

Sub-Matrix: **Water**

(Matrix: **Water**)

Client sample ID: Pond B

Client sampling date / time: 13-Jul-2023 11:15

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Sodium, dissolved	7440-23-5	196	0.050	mg/L	E421/EO A	14-Jul-2023	14-Jul-2023	1039257
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	14-Jul-2023	1039257

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.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : EO2306129</p> <p>Client : Clean Harbors Environmental Services, Inc.</p> <p>Contact : Todd Webb</p> <p>Address : PO Box 390, 50114 Range Road 173 AB Canada T0B4A0</p> <p>Telephone : 780 663 2513</p> <p>Project : Pond B July 13 - Sodium</p> <p>PO : 234905</p> <p>C-O-C number : ----</p> <p>Sampler : TW</p> <p>Site : Table 4.3B</p> <p>Quote number : EO22-CHES100-008</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</p>	<p>Page : 1 of 5</p> <p>Laboratory : ALS Environmental - Edmonton</p> <p>Account Manager : Megha Walia</p> <p>Address : 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9</p> <p>Telephone : +1 780 413 5227</p> <p>Date Samples Received : 13-Jul-2023 14:00</p> <p>Issue Date : 15-Jul-2023 14:58</p>
--	---

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)

- No Analysis Holding Time Outliers exist.

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	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) Pond B	E421	13-Jul-2023	14-Jul-2023	180 days	1 days	✔	14-Jul-2023	179 days	0 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Laboratory Control Samples (LCS)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Method Blanks (MB)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	5.0	✔
Matrix Spikes (MS)							
Dissolved Metals in Water by CRC ICPMS	E421	1039257	1	2	50.0	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").

<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .



QUALITY CONTROL REPORT

Work Order	: EO2306129	Page	: 1 of 3
Client	: Clean Harbors Environmental Services, Inc.	Laboratory	: ALS Environmental - Edmonton
Contact	: Todd Webb	Account Manager	: Megha Walia
Address	: PO Box 390, 50114 Range Road 173 AB Canada T0B4A0	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	:	Telephone	: +1 780 413 5227
Project	: Pond B July 13 - Sodium	Date Samples Received	: 13-Jul-2023 14:00
PO	: 234905	Date Analysis Commenced	: 14-Jul-2023
C-O-C number	: ----	Issue Date	: 15-Jul-2023 14:57
Sampler	: TW 780 663 2513		
Site	: Table 4.3B		
Quote number	: EO22-CHES100-008		
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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Daniel Nguyen	Lab Assistant	Edmonton Metals, Edmonton, Alberta



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
Dissolved Metals (QC Lot: 1039257)											
EO2306128-001	Anonymous	Sodium, dissolved	7440-23-5	E421	0.050	mg/L	227	214	5.93%	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
Dissolved Metals (QCLot: 1039257)						
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level \geq 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
Dissolved Metals (QCLot: 1039257)										
EO2306129-001	Pond B	Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page of

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

AFFIX ALS BARCODE LABEL HERE (ALS use only)

- Routine [R] if received by 3pm M-F - no surcharges apply
- 4 day [F4] if received by 3pm M-F - 20% rush surcharge minimum
- 3 day [F3] if received by 3pm M-F - 25% rush surcharge minimum
- 2 day [F2] if received by 3pm M-F - 50% rush surcharge minimum
- 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- Same day [E2] if received by 10am M-S - 200% rush surcharge

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all ESP TATs:

dd-mm-yy hh:mm am/p

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Report To: Contact and company name below will appear on the final report

Company: Clean Harbors Canada

Contact: Todd Webb, Stan Yulha
(780) 663-2513

Phone: Company address below will appear on the final report

Street: PO Box 390, 50114 Range Road 173

City/Province: Ryley, AB

Postal Code: T0B 4A0

Invoice To: Same as Report To YES NO

Company: Clean Harbors Canada

Contact: Stephanie Dennis

ALS Account # / Quote #: EO22-CHES100-008 (Table 4.3B)

Job #: Pond B July 13 - Sodium

PO / AFE: 234905

LSD: Table 4.3B

Select Report Format: PDF EXCEL EDD (DIGITAL)

Merge QC/QCI Reports with COA YES NO N/A

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: EMAIL MAIL FAX

Email 1 or Fax: webb.todd@cleanharbors.com

Email 2: yulha.stan@cleanharbors.com

Email 3:

Invoice Recipients

Select Invoice Distribution: EMAIL MAIL FAX

Email 1 or Fax: Dennis, Stephanie@cleanharbors.com

Email 2:

Oil and Gas Required Fields (client use)

ATE/Cost Center:

Major/Minor Code:

Requisitioner:

Location:

NUMBER OF CONTAINERS	ANALYSIS REQUEST	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
1	Dissolved Sodium			
P2				

ALS Lab Work Order # (ALS use only): B2506129

Sample Identification and/or Coordinates (This description will appear on the report)

Pond B

ALS Contact: Megha Walia

Sampler: Todd Webb

Date (dd-mm-yy): 13-Jul-23

Time (hh:mm): 11:15

Sample Type: Surface Water

Drinking Water (DW) Samples¹ (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Released by:	Date:	Time:	Received by:	Date:	Time:
Todd Webb	13-Jul-23	11:30	[Signature]	13-Jul-23	11:30

SHIPPING RELEASE (client use)

SHIPMENT RECEIPT (ALS use only)

INITIAL SHIPMENT RECEPTION (ALS use only)

FINAL SHIPMENT RECEPTION (ALS use only)

Shipping Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED

Submission Comments Identified on Sample Receipt Notification: YES NO

Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A

INITIAL COOLER TEMPERATURES °C: 12.7

FINAL COOLER TEMPERATURES °C:

FEB 2022 FRONT

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

Environmental Division
Edmonton
Work Order Reference
EO2306129

Telephone: +1 780 413 6227