



May 11<sup>th</sup>, 2022

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

Dear Sir/Madam:

**Re:** Industrial Runoff Report for April 2022 Approval 10348-03-00

Enclosed is the Industrial Runoff Report as required by Sections 4.3.16 and 4.3.17 of the above approval. April's discharge occurred over 3 days, April 23<sup>rd</sup>, 24<sup>th</sup> and concluded on the 25<sup>th</sup>.

The full results were received from ALS Labs on April 19<sup>th</sup> reviewed by Lab Management and the General Manager. We only discharged from pond C in April, as pond C passed all the parameters however pond B analytical parameters did not meet all the specifications for discharge.

April's volume total was 1940 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 equipment.

Yours truly,  
**Clean Harbors Canada, Inc.**

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

Stan Yuha  
Facility Manager





**Environmental**

## CERTIFICATE OF ANALYSIS

**Work Order** : **EO2202394**  
**Client** : **Clean Harbors Environmental Services, Inc.**  
**Contact** : Todd Webb  
**Address** : 9808 12 Avenue SW  
Edmonton AB Canada T6X 0J5  
**Telephone** : 780 663 2513  
**Project** : Pond B+C  
**PO** : EO2202394  
**C-O-C number** : 20-966657  
**Sampler** : TD  
**Site** : Table 4.3B  
**Quote number** : Q82439 / Q82442  
**No. of samples received** : 2  
**No. of samples analysed** : 2

**Page** : 1 of 4  
**Laboratory** : Edmonton - Environmental  
**Account Manager** : Pamela Toledo  
**Address** : 9450 - 17 Avenue NW  
Edmonton AB Canada T6N 1M9  
**Telephone** : +1 780 413 5227  
**Date Samples Received** : 11-Apr-2022 14:45  
**Date Analysis Commenced** : 11-Apr-2022  
**Issue Date** : 19-Apr-2022 15:06

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
Austin Wasylshyn	Lab Analyst	Metals, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Kieran Tordoff	Account Manager	External Subcontracting, Calgary, Alberta
Kira Sampley	Lab Analyst	Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Inorganics, Edmonton, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta



## General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances  
LOR: Limit of Reporting (detection limit).

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

<: less than.

>: greater than.

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

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

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



## Analytical Results

Sub-Matrix: Water					Client sample ID	Pond B	Pond C	----	----	----
(Matrix: Water)					Client sampling date / time	11-Apr-2022 11:30	11-Apr-2022 11:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	EO2202394-001	EO2202394-002	-----	-----	-----	
					Result	Result	----	----	----	
<b>Physical Tests</b>										
pH	----	E108	0.10	pH units	8.01	7.97	----	----	----	
solids, total dissolved [TDS]	----	E162	10	mg/L	1170	440	----	----	----	
solids, total suspended [TSS]	----	E160	3.0	mg/L	30.6	8.2	----	----	----	
<b>Anions and Nutrients</b>										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.244	0.0186	----	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	69.3	52.0	----	----	----	
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	604	167	----	----	----	
<b>Bioassays</b>										
Daphnia magna LC50	----	DAP-LC50-48	-	-	See attached	See attached	----	----	----	
trout bioassay LC50	----	TRT-LC50-96	-	-	See attached	See attached	----	----	----	
<b>Total Metals</b>										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.952	0.248	----	----	----	
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00061	0.00030	----	----	----	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00284	0.00127	----	----	----	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0727	0.0407	----	----	----	
beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000033	<0.000020	----	----	----	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
boron, total	7440-42-8	E420	0.010	mg/L	0.117	0.048	----	----	----	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000117	0.0000637	----	----	----	
calcium, total	7440-70-2	E420	0.050	mg/L	50.5	36.4	----	----	----	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000295	0.000187	----	----	----	
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00388	0.00160	----	----	----	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00146	0.00106	----	----	----	
copper, total	7440-50-8	E420	0.00050	mg/L	0.0166	0.00597	----	----	----	
iron, total	7439-89-6	E420	0.010	mg/L	1.19	0.632	----	----	----	
lead, total	7439-92-1	E420	0.000050	mg/L	0.00224	0.00203	----	----	----	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0634	0.0151	----	----	----	
magnesium, total	7439-95-4	E420	0.0050	mg/L	26.7	11.0	----	----	----	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.254	0.442	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	Pond B	Pond C	----	----	----
(Matrix: Water)					Client sampling date / time	11-Apr-2022 11:30	11-Apr-2022 11:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	EO2202394-001	EO2202394-002	-----	-----	-----	
					Result	Result	---	---	---	
<b>Total Metals</b>										
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.149	0.0324	----	----	----	
nickel, total	7440-02-0	E420	0.00050	mg/L	0.0230	0.00902	----	----	----	
phosphorus, total	7723-14-0	E420	0.050	mg/L	0.104	0.075	----	----	----	
potassium, total	7440-09-7	E420	0.050	mg/L	7.22	3.43	----	----	----	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00337	0.00124	----	----	----	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000858	0.000311	----	----	----	
silicon, total	7440-21-3	E420	0.10	mg/L	3.55	0.94	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	0.000041	0.000013	----	----	----	
sodium, total	7440-23-5	E420	0.050	mg/L	277	91.6	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.566	0.257	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	232	61.8	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	0.000012	<0.000010	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	0.00025	<0.00010	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	0.00034	<0.00010	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.0142	0.00522	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00255	0.00060	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00918	0.00106	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.214	0.00987	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0670	0.0291	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00143	0.00039	----	----	----	
<b>Aggregate Organics</b>										
chemical oxygen demand [COD]	----	E559-L	10	mg/L	60	42	----	----	----	
oil & grease (visible sheen)	----	E566	-	-	Absent	Absent	----	----	----	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>EO2202394</b>	Page	: 1 of 8
Client	: <b>Clean Harbors Environmental Services, Inc.</b>	Laboratory	: Edmonton - Environmental
Contact	: Todd Webb	Account Manager	: Pamela Toledo
Address	: 9808 12 Avenue SW Edmonton AB Canada T6X 0J5	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 663 2513	Telephone	: +1 780 413 5227
Project	: Pond B+C	Date Samples Received	: 11-Apr-2022 14:45
PO	: EO2202394	Issue Date	: 19-Apr-2022 15:06
C-O-C number	: 20-966657		
Sampler	: TD		
Site	: Table 4.3B		
Quote number	: Q82439 / Q82442		
No. of samples received	: 2		
No. of samples analysed	: 2		

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 Services 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	
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> Pond B	E559-L	11-Apr-2022	----	----	----		12-Apr-2022	28 days	1 days	✓
<b>Aggregate Organics : Chemical Oxygen Demand by Colourimetry (Low Level)</b>										
<b>Amber glass total (sulfuric acid)</b> Pond C	E559-L	11-Apr-2022	----	----	----		12-Apr-2022	28 days	1 days	✓
<b>Aggregate Organics : Oil &amp; Grease by Visible Sheen</b>										
<b>Amber glass (hydrochloric acid)</b> Pond B	E566	11-Apr-2022	----	----	----		14-Apr-2022	28 days	3 days	✓
<b>Aggregate Organics : Oil &amp; Grease by Visible Sheen</b>										
<b>Amber glass (hydrochloric acid)</b> Pond C	E566	11-Apr-2022	----	----	----		14-Apr-2022	28 days	3 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Pond B	E298	11-Apr-2022	13-Apr-2022	----	----		13-Apr-2022	28 days	2 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> Pond C	E298	11-Apr-2022	13-Apr-2022	----	----		13-Apr-2022	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> Pond B	E235.Cl	11-Apr-2022	----	----	----		11-Apr-2022	28 days	0 days	✓



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
Rec	Actual	Rec		Actual							
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE Pond C	E235.Cl	11-Apr-2022	----	----	----		11-Apr-2022	28 days	0 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Pond B	E235.SO4	11-Apr-2022	----	----	----		11-Apr-2022	28 days	0 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE Pond C	E235.SO4	11-Apr-2022	----	----	----		11-Apr-2022	28 days	0 days	✓	
<b>Bioassays : Survival/LC50 Daphnia Magna 48 hours</b>											
LDPE carboy Pond B	DAP-LC50-48	11-Apr-2022	----	----	----		19-Apr-2022	5 days	8 days	* EHT	
<b>Bioassays : Survival/LC50 Daphnia Magna 48 hours</b>											
LDPE carboy Pond C	DAP-LC50-48	11-Apr-2022	----	----	----		19-Apr-2022	5 days	8 days	* EHT	
<b>Bioassays : Survival/LC50 Rainbow Trout (96 hours)</b>											
LDPE carboy Pond B	TRT-LC50-96	11-Apr-2022	----	----	----		19-Apr-2022	5 days	8 days	* EHT	
<b>Bioassays : Survival/LC50 Rainbow Trout (96 hours)</b>											
LDPE carboy Pond C	TRT-LC50-96	11-Apr-2022	----	----	----		19-Apr-2022	5 days	8 days	* EHT	
<b>Physical Tests : pH by Meter</b>											
HDPE Pond B	E108	11-Apr-2022	----	----	----		12-Apr-2022	0.25 hrs	27 hrs	* EHTR-FM	
<b>Physical Tests : pH by Meter</b>											
HDPE Pond C	E108	11-Apr-2022	----	----	----		12-Apr-2022	0.25 hrs	27 hrs	* EHTR-FM	



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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE Pond B	E162	11-Apr-2022	----	----	----		12-Apr-2022	7 days	1 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE Pond C	E162	11-Apr-2022	----	----	----		12-Apr-2022	7 days	1 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE Pond B	E160	11-Apr-2022	----	----	----		12-Apr-2022	7 days	1 days	✓
<b>Physical Tests : TSS by Gravimetry</b>										
HDPE Pond C	E160	11-Apr-2022	----	----	----		12-Apr-2022	7 days	1 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) Pond B	E420	11-Apr-2022	----	----	----		12-Apr-2022	180 days	1 days	✓
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE total (nitric acid) Pond C	E420	11-Apr-2022	----	----	----		12-Apr-2022	180 days	1 days	✓

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHT: Exceeded ALS recommended hold time prior to analysis.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

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

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Ammonia by Fluorescence	E298	457340	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	456254	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	455807	1	9	11.1	5.0	✓
pH by Meter	E108	456259	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	455811	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	456017	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	455999	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	456015	2	31	6.4	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Ammonia by Fluorescence	E298	457340	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	456254	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	455807	1	9	11.1	5.0	✓
pH by Meter	E108	456259	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	455811	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	456017	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	455999	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	456015	2	31	6.4	5.0	✓
<b>Method Blanks (MB)</b>							
Ammonia by Fluorescence	E298	457340	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	456254	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	455807	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	455811	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	456017	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	455999	1	20	5.0	5.0	✓
TSS by Gravimetry	E160	456015	2	31	6.4	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	457340	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L	456254	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	455807	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	455811	1	6	16.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	455999	1	20	5.0	5.0	✓



## Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Survival/LC50 Daphnia Magna 48 hours	DAP-LC50-48  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	Water	EPS1/RM/14	See attached report.
pH by Meter	E108  Edmonton - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$ ). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160  Edmonton - Environmental	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at $104 \pm 1^\circ\text{C}$ , 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  Edmonton - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at $180 \pm 2^\circ\text{C}$ for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl  Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4  Edmonton - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298  Calgary - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Metals in Water by CRC ICPMS	E420  Edmonton - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Chemical Oxygen Demand by Colourimetry (Low Level)	E559-L  Edmonton - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Oil & Grease by Visible Sheen	E566  Edmonton - Environmental	Water	Alberta Energy Regulator, Drilling waste Management, Directive 050, July 2016	Use a qualitative visual observation of rainbow sheen to determine the presence or absence of oil and grease on water.
Survival/LC50 Rainbow Trout (96 hours)	TRT-LC50-96  Nautilus Environmental (Calgary) - 10828 27 Street SE Calgary Alberta Canada T2Z 3V9	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  Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



## QUALITY CONTROL REPORT

Work Order : **EO2202394**

Page : 1 of 10

Client : Clean Harbors Environmental Services, Inc.  
 Contact : Todd Webb  
 Address : 9808 12 Avenue SW  
 Edmonton AB Canada T6X 0J5  
 Telephone : 780 663 2513  
 Project : Pond B+C  
 PO : EO2202394  
 C-O-C number : 20-966657  
 Sampler : TD  
 Site : Table 4.3B  
 Quote number : Q82439 / Q82442  
 No. of samples received : 2  
 No. of samples analysed : 2

Laboratory : Edmonton - Environmental  
 Account Manager : Pamela Toledo  
 Address : 9450 - 17 Avenue NW  
 Edmonton, Alberta Canada T6N 1M9  
 Telephone : +1 780 413 5227  
 Date Samples Received : 11-Apr-2022 14:45  
 Date Analysis Commenced : 11-Apr-2022  
 Issue Date : 19-Apr-2022 15:06

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 Percentage Difference (RPD) and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits
- Reference Material (RM) Report; Recovery and Acceptance Limits
- Method Blank (MB) Report; Recovery and Acceptance Limits
- Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

### 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
Austin Wasylshyn	Lab Analyst	Metals, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Inorganics, Edmonton, Alberta
Geoff Berg	Lab Analyst	Organics, Edmonton, Alberta
Kieran Tordoff	Account Manager	External Subcontracting, Calgary, Alberta
Kira Sampley	Lab Analyst	Inorganics, Edmonton, Alberta
Muzammil Ali	Lab Analyst	Inorganics, Edmonton, Alberta
Parker Sgarbossa	Laboratory Analyst	Inorganics, Calgary, Alberta

Page : 2 of 10  
Work Order : EO2202394  
Client : Clean Harbors Environmental Services, Inc.  
Project : Pond B+C

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## **General Comments**

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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

## **Workorder Comments**

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

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### Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 456014)</b>											
EO2202284-012	Anonymous	solids, total suspended [TSS]	----	E160	3.0	mg/L	7.8	7.8	0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 456015)</b>											
EO2202394-002	Pond C	solids, total suspended [TSS]	----	E160	3.0	mg/L	8.2	9.2	1.0	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 456017)</b>											
EO2202284-016	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	662	652	1.52%	20%	----
<b>Physical Tests (QC Lot: 456259)</b>											
EO2202389-001	Anonymous	pH	----	E108	0.10	pH units	7.23	7.13	1.39%	3%	----
<b>Anions and Nutrients (QC Lot: 455807)</b>											
EO2202389-002	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	22.5	22.5	0.00444%	20%	----
<b>Anions and Nutrients (QC Lot: 455811)</b>											
EO2202389-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	58.3	58.6	0.553%	20%	----
<b>Anions and Nutrients (QC Lot: 457340)</b>											
CG2204143-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 455999)</b>											
EO2202362-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.376	0.374	0.312%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00050	0.00049	0.000009	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00079	0.00080	0.00001	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0686	0.0718	4.44%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.020	0.020	0.0004	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000389	0.0000398	0.0000009	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	22.4	22.2	1.14%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000035	0.000034	0.0000009	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.000050	mg/L	0.00106	0.00110	0.00005	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00082	0.00078	0.00004	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00613	0.00610	0.625%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.580	0.575	0.868%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000642	0.000625	2.73%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0029	0.0030	0.00010	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.89	1.88	0.728%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 455999) - continued</b>											
EO2202362-001	Anonymous	manganese, total	7439-96-5	E420	0.00010	mg/L	0.150	0.150	0.0371%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00389	0.00376	3.43%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0222	0.0226	1.44%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.058	0.068	0.010	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	2.38	2.36	0.876%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00148	0.00144	0.00004	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000174	0.000183	0.000009	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.16	2.16	0.0638%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000028	0.000027	0.000002	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	59.4	57.5	3.26%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0744	0.0720	3.15%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	2.57	2.49	0.08	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	0.00011	<0.00010	0.00001	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00011	0.00011	0.000002	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00906	0.00892	1.55%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00292	0.00258	12.3%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000966	0.000963	0.301%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00197	0.00198	0.00001	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0515	0.0501	2.68%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00061	0.00049	0.00012	Diff <2x LOR	----
<b>Aggregate Organics (QC Lot: 456254)</b>											
EO2202349-006	Anonymous	chemical oxygen demand [COD]	----	E559-L	100	mg/L	938	950	12	Diff <2x LOR	----



## Method Blank (MB) Report

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

### Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 456014)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 456015)</b>						
solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
<b>Physical Tests (QCLot: 456017)</b>						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
<b>Anions and Nutrients (QCLot: 455807)</b>						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 455811)</b>						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 457340)</b>						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Total Metals (QCLot: 455999)</b>						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 455999) - continued</b>						
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Aggregate Organics (QCLot: 456254)</b>						
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
<b>Physical Tests (QCLot: 456014)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	101	85.0	115	----
<b>Physical Tests (QCLot: 456015)</b>									
solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	94.3	85.0	115	----
<b>Physical Tests (QCLot: 456017)</b>									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	98.7	85.0	115	----
<b>Physical Tests (QCLot: 456259)</b>									
pH	----	E108	----	pH units	6 pH units	102	97.0	103	----
<b>Anions and Nutrients (QCLot: 455807)</b>									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 455811)</b>									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 457340)</b>									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.0	85.0	115	----
<b>Total Metals (QCLot: 455999)</b>									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	105	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.9	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.1	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.7	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.0	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 455999) - continued</b>									
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	98.3	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	105	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	104	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.7	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.7	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	95.3	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.0	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.9	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.9	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	92.6	80.0	120	----
<b>Aggregate Organics (QCLot: 456254)</b>									
chemical oxygen demand [COD]	----	E559-L	10	mg/L	100 mg/L	98.3	85.0	115	----



### Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 455807)</b>										
EO2202389-002	Anonymous	chloride	16887-00-6	E235.Cl	94.6 mg/L	100 mg/L	94.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 455811)</b>										
EO2202389-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	91.8 mg/L	100 mg/L	91.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 457340)</b>										
CG2204143-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0994 mg/L	0.1 mg/L	99.4	75.0	125	----
<b>Total Metals (QCLot: 455999)</b>										
EO2202363-001	Anonymous	aluminum, total	7429-90-5	E420	0.192 mg/L	0.2 mg/L	96.3	70.0	130	----
		antimony, total	7440-36-0	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00981 mg/L	0.01 mg/L	98.1	70.0	130	----
		boron, total	7440-42-8	E420	0.107 mg/L	0.1 mg/L	107	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00984 mg/L	0.01 mg/L	98.4	70.0	130	----
		chromium, total	7440-47-3	E420	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		copper, total	7440-50-8	E420	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		iron, total	7439-89-6	E420	1.88 mg/L	2 mg/L	93.8	70.0	130	----
		lead, total	7439-92-1	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		lithium, total	7439-93-2	E420	0.0955 mg/L	0.1 mg/L	95.5	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		nickel, total	7440-02-0	E420	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.4 mg/L	10 mg/L	104	70.0	130	----
		potassium, total	7440-09-7	E420	3.75 mg/L	4 mg/L	93.8	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		selenium, total	7782-49-2	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		silicon, total	7440-21-3	E420	9.39 mg/L	10 mg/L	93.9	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 455999) - continued</b>										
EO2202363-001	Anonymous	silver, total	7440-22-4	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	19.2 mg/L	20 mg/L	96.3	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0370 mg/L	0.04 mg/L	92.5	70.0	130	----
		thallium, total	7440-28-0	E420	0.00382 mg/L	0.004 mg/L	95.5	70.0	130	----
		thorium, total	7440-29-1	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, total	7440-31-5	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		titanium, total	7440-32-6	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		uranium, total	7440-61-1	E420	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0972 mg/L	0.1 mg/L	97.2	70.0	130	----
		zinc, total	7440-66-6	E420	0.356 mg/L	0.4 mg/L	88.9	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
<b>Aggregate Organics (QCLot: 456254)</b>										
EO2202349-007	Anonymous	chemical oxygen demand [COD]	----	E559-L	ND mg/L	100 mg/L	ND	75.0	125	----





# Acute Toxicity Test Results

Samples collected April 11, 2022

Final Report

April 19, 2022

Submitted to: **ALS Environmental**  
Edmonton, AB

## SAMPLE INFORMATION

Sample ID/ Internal ID	Dates				Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EO2202394-001 Pond B/ 2122-1886-01	11-Apr-22 at 1130h	12-Apr-22 at 1600h	13-Apr-22 at 1535h	13-Apr-22 at 1455h	14.8°C
EO2202394-002 Pond C/ 2122-1886-02	11-Apr-22 at 1100h	12-Apr-22 at 1600h	13-Apr-22 at 1540h	13-Apr-22 at 1500h	15.1°C

## TEST TYPES

- Rainbow trout 96-h LC50 test
- *Daphnia magna* 48-h LC50, EC50 test

## RESULTS

### Toxicity test results

Sample ID	LC50/EC50 (% v/v)		
	Rainbow trout	<i>Daphnia magna</i>	
	LC50	LC50	EC50
EO2202394-001 Pond B	>100	>100	>100
EO2202394-002 Pond C	>100	>100	>100

LC = Lethal Concentration, EC= Effect Concentration

## QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CL)	3.9 (3.5-4.4) g/L KCl <sup>1</sup>	6.2 (5.9-6.5) g/L NaCl <sup>2</sup>
Reference toxicant historical mean (2 SD Range)	3.3 (2.5-4.5) g/L KCl	6.5 (5.5-7.7) g/L NaCl
Reference toxicant CV	9.7%	5.7%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

<sup>1</sup> Test date, April 11, 2022; <sup>2</sup> Test Date April 11, 2022

LC = Lethal Concentration; CL = Confidence Limit, SD = Standard Deviation; CV = Coefficient of Variation



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Report By:  
Courtney Hewitt, BSc  
Biologist



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Reviewed By:  
Tamara Pomeroy, BSc  
Laboratory and Quality Manager

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

**APPENDIX A – Summary of test conditions**

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**Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.**

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Fish hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	5 gallon glass aquariums
Test volume	10 - 20 L, depending on size of fish
Test solution depth	Minimum 15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	None
Test endpoints	96-hour LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

**Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.**

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL plastic vessels
Test volume	150 mL
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water amended with 4 mg/L KCl and with B12 (2 µg/L) and Na <sub>2</sub> SeO <sub>4</sub> (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	None
Test endpoints	48-h LC50
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

**APPENDIX B – Toxicity test data**

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# Trout Bench Sheet

Method TRD Client ALS106 Reference 2122-1886-01 Chamber 2

**Test Log**

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2022-04-13	1535 *	MAF/CC	7	YTM
1	2022-04-14	0830	JCC	-	MAF
2	2022-04-15	0905	NA	-	MAF
3	2022-04-16	0900	NA	-	LW
4	2022-04-17	1010	MAF/CC	1	YTM

**Sample Information**

Initial pH: 8.0  
 Initial EC (µS/cm): 1699  
 Salinity (ppt): 2

Note: \*; time when the test was loaded with fish

**Sample Pre-Aeration**

Aeration rate adjusted to 6.5 +/- 1 mL/min/L yes/no

Preaeration time

DO(mg/L) of 100%

Temp (°C) of 100%

0 hours	0.5 hours	1 hour	1.5 hours	2 hours
<u>9.8</u>	<u>9.7</u>	<u>8.9</u>		
<u>14</u>				

**DO in mg/L (70% - 100% saturation)\*\***

6.2 mg/L - 8.9 mg/L at 14°C

6.1 mg/L - 8.8 mg/L at 15°C

6.0 mg/L - 8.6 mg/L at 16°C

\*\*corrected for altitude

**Test Chemistry and Biology**

Conc.	CTL	6	12	25	50	100
-------	-----	---	----	----	----	-----

**pH (units) (range: 5.5-8.5)**

Day 0	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.6</u>	<u>7.7</u>	<u>7.9</u>
Day 4	<u>8.0</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.2</u>	<u>8.2</u>

**EC (µS/cm)**

Day 0	<u>481</u>	<u>555</u>	<u>659</u>	<u>746</u>	<u>964</u>	<u>1123</u>
Day 4	<u>500</u>	<u>573</u>	<u>683</u>	<u>775</u>	<u>996</u>	<u>1689</u>

**DO (mg/L) (70-100% saturation at test temp.)**

Day 0	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>
Day 4	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>

**Temperature (°C) (range: 14-16°C)**

Day 0	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>
Day 4	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>	<u>16</u>

**Number Alive (In brackets number stressed)**

Day 0	10	10	10	10	10	10
Day 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

**Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control**

Unless otherwise noted, behavior is considered to be normal

**Control Organism Data**

Control Fish	Length (cm)	Weight (g)
1	<u>3.3</u>	<u>0.4</u>
2	<u>2.8</u>	<u>0.5</u>
3	<u>2.8</u>	<u>0.5</u>
4	<u>3.0</u>	<u>0.3</u>
5	<u>3.0</u>	<u>0.3</u>
6	<u>2.8</u>	<u>0.3</u>
7	<u>2.7</u>	<u>0.3</u>
8	<u>3.1</u>	<u>0.3</u>
9	<u>3.2</u>	<u>0.3</u>
10	<u>3.7</u>	<u>0.3</u>

Loading Density (g/L):  
(must be ≤0.5 g/L)

0.2

Mean Length (cm):

3.0

Length Range (cm):

2.7-3.3

Mean Weight (g):  
(Must be ≥0.3g)

0.3

Weight Range (g):

0.3-0.4

**Test Organism Information**

Batch 2022024TR

Source Troutlodge

Tank # 9

Days Held at 15± 2°C 21  
(must be ≥14 days)

Percent stock mortality 0  
(7 days prior to test, must be ≤2%)

Test Volume (L) 18

Comments :

Reviewed By: SS

Date Reviewed: 202210118



Method TRD Client ALS106 Reference 2122-1886-02 Chamber 2

**Test Log**

Day	Date	Time	Initial	Chem. Cart	Daily Data Review
0	2022-04-13	1540 *	MAF/CC	7	km
1	2022-04-14	0830	TCC	-	MAF
2	2022-04-15	0910	NA	-	MAF
3	2022-04-16	0900	NA	-	km
4	2022-04-17	0810	Jill/CC/MAF	1	km

**Sample Information**

Initial pH: 8.0  
 Initial EC (µS/cm): 706  
 Salinity (ppt): 2

Note: \* ; time when the test was loaded with fish

**Sample Pre-Aeration**

Aeration rate adjusted to 6.5 +/- 1 mL/min/L  yes/no  
 Preaeration time  
 DO(mg/L) of 100%  
 Temp (°C) of 100%

0 hours	0.5 hours	1 hour	1.5 hours	2 hours
<u>9.9</u>	<u>9.6</u>	<u>8.8</u>		
<u>15</u>				

**DO in mg/L (70% - 100% saturation)\*\***

6.2 mg/L - 8.9 mg/L at 14°C  
 6.1 mg/L - 8.8 mg/L at 15°C  
 6.0 mg/L - 8.6 mg/L at 16°C

\*\*corrected for altitude

**Test Chemistry and Biology**

Conc.	CTL	6	12	25	50	100
-------	-----	---	----	----	----	-----

**pH (units) (range: 5.5-8.5)**

Day 0	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.9</u>
Day 4	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>7.9</u>

**EC (µS/cm)**

Day 0	<u>482</u>	<u>493</u>	<u>503</u>	<u>530</u>	<u>582</u>	<u>687</u>
Day 4	<u>492</u>	<u>507</u>	<u>520</u>	<u>549</u>	<u>605</u>	<u>715</u>

**DO (mg/L) (70-100% saturation at test temp.)**

Day 0	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>	<u>8.9</u>	<u>9.9</u>	<u>8.8</u>
Day 4	<u>8.6</u>	<u>8.6</u>	<u>8.8</u>	<u>8.8</u>	<u>8.8</u>	<u>8.6</u>

**Temperature (°C) (range: 14-16°C)**

Day 0	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>	<u>14</u>	<u>15</u>
Day 4	<u>16</u>	<u>16</u>	<u>15</u>	<u>15</u>	<u>15</u>	<u>16</u>

**Number Alive (In brackets number stressed)**

Day 0	10	10	10	10	10	10
Day 1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 3	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Day 4	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control  
 Unless otherwise noted, behavior is considered to be normal

Control Organism Data			Test Organism Information	
Control Fish	Length (cm)	Weight (g)		
1	<u>2.3</u>	<u>0.4</u>	Loading Density (g/L): (must be ≤0.5 g/L)	<u>0.2</u>
2	<u>2.3</u>	<u>0.3</u>		Source <u>Troutlodge</u>
3	<u>2.7</u>	<u>0.2</u>	Mean Length (cm):	<u>2.9</u>
4	<u>2.2</u>	<u>0.2</u>		Tank # <u>9</u>
5	<u>2.6</u>	<u>0.2</u>	Length Range (cm):	<u>2.6-3.3</u>
6	<u>2.1</u>	<u>0.2</u>		Days Held at 15± 2°C <u>21</u> (must be ≥14 days)
7	<u>2.1</u>	<u>0.2</u>	Mean Weight (g): (Must be ≥0.3g)	<u>0.3</u>
8	<u>2.0</u>	<u>0.2</u>		Percent stock mortality <u>0</u> (7 days prior to test, must be ≤2%)
9	<u>2.0</u>	<u>0.2</u>	Weight Range (g):	<u>0.2-0.4</u>
10	<u>2.1</u>	<u>0.2</u>		Test Volume (L) <u>18</u>

Comments :

Reviewed By: SS

Date Reviewed: 2022104118

# Daphnia Bench Sheet

Method DAD

Client ALS106

Reference 7127-1886-01

**Test Log**

**Sample Information**

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:
0	2022/04/13	1455	EP/CH	2	MAF	<u>8.0</u>
1	2022/04/14	1000	PC	-	MAF	Initial EC (µS/cm): <u>1699</u>
2	2022/04/15	0840	MAF	2	PC	Salinity (ppt): <u>2</u>

Lab Code	CTL	6	12	25	50	100

day

	pH (units) (range: 6.0-8.5)					
0	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>
2	<u>8.3</u>	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>	<u>8.1</u>

The pH of the sample was not adjusted prior to test setting, unless noted in the comments below

	EC (uS/cm) <u>1571</u>					
0	<u>480</u>	<u>540</u>	<u>608</u>	<u>756</u>	<u>1043</u>	<u>8100 EP</u>
2	<u>510</u>	<u>551</u>	<u>611</u>	<u>766</u>	<u>1028</u>	<u>1540</u>

	DO (mg/L) (40-100% saturation at test temp.)					
0	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>8.1</u>
2	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>

	Temperature (°C) (range: 18-22 °C)					
0	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>19</u>
2	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>

	Number Alive (I, immobile)					
0	10	10	10	10	10	10
1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

**Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control**

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

<b>Culture</b> Young jar <u>C5</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>0%</u>
<b>QA</b> (previous month) Days to first brood (≤12 days) <u>7</u> Average number of young produced (≥15 young) <u>31</u> Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	<b>Control Validity Criteria</b> Mean % mortality at 48 hours - (must be ≤10%) <u>0</u>
<b>Sample</b> DO (mg/L) of sample prior to aeration: <u>10.9</u> DO % of sample prior to aeration: <u>117</u> Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>20min</u> Hardness (mg CaCO <sub>3</sub> /L) of 100%: <u>166</u> Hardness of sample after adjustment (must be between 25 - 30 mg CaCO <sub>3</sub> /L) <u>—</u> Alkalinity of 100% sample (mg CaCO <sub>3</sub> /L): <u>—</u>	Temperature (°C) of sample prior to aeration: <u>18</u> Is aeration required (<40% or >100%)? <input checked="" type="radio"/> Yes or <input type="radio"/> No Filtered with 110µm screen prior to testing <input checked="" type="radio"/> Yes or <input type="radio"/> No Is hardness adjustment required (<25 mg CaCO <sub>3</sub> /L)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
<b>Dilution Water</b> Pail label / preparation date <u>1:24/11</u> Hardness of dilution water (mg/L) <u>209</u>	<b>DO Levels (40-100% saturation) - corrected for altitude -</b> 3.3 to 8.2 mg/L at 18°C      3.1 to 7.7 mg/L at 21°C 3.2 to 8.1 mg/L at 19°C      3.0 to 7.6 mg/L at 22°C 3.2 to 7.9 mg/L at 20°C
<b>Comments/Observations:</b>	

Reviewed By: SS

Date Reviewed: 2022.04.18

Method DAD

Client ALS106

Reference 2122-18EG-02

**Test Log**

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Sample Information
0	2022/04/13	1500	EP/CH	2	MF	Initial pH: <u>8.0</u>
1	2022/04/14	1000	SC	-	MAP	Initial EC (µS/cm): <u>706</u>
2	2022/04/15	0835	MAP	2	JC	Salinity (ppt): <u>2</u>

Lab Code	CTL	6	12	25	50	100

day	pH (units) (range: 6.0-8.5)					
0	<u>8.1</u>	<u>8.1</u>	<u>8.1</u>	<u>8.0</u>	<u>8.0</u>	<u>7.9</u>
2	<u>8.2</u>	<u>8.2</u>	<u>8.2</u>	<u>8.1</u>	<u>8.1</u>	<u>8.0</u>

The pH of the sample was not adjusted prior to test setting, unless noted in the comments below

day	EC (uS/cm)					
0	<u>467</u>	<u>486</u>	<u>501</u>	<u>523</u>	<u>575</u>	<u>668</u>
2	<u>484</u>	<u>494</u>	<u>501</u>	<u>524</u>	<u>575</u>	<u>667</u>

day	DO (mg/L) (40-100% saturation at test temp.)					
0	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>8.2</u>
2	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>

day	Temperature (°C) (range: 18-22 °C)					
0	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>18</u>
2	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>	<u>21</u>

day	Number Alive (I, immobile)					
0	10	10	10	10	10	10
1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10 (IE)</u>
2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

<b>Culture</b> Young jar <u>CS</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>0%</u>
<b>QA</b> (previous month) Days to first brood (≤12 days) <u>7</u> Average number of young produced (≥15 young) <u>31</u> Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	<b>Control Validity Criteria</b> Mean % mortality at 48 hours - (must be ≤10%) <u>0</u>
<b>Sample</b> DO (mg/L) of sample prior to aeration: <u>11.0</u> DO % of sample prior to aeration: <u>117</u> Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>20 min</u> Hardness (mg CaCO <sub>3</sub> /L) of 100%: <u>87</u> Hardness of sample after adjustment (must be between 25 - 30 mg CaCO <sub>3</sub> /L) <u>—</u> Alkalinity of 100% sample (mg CaCO <sub>3</sub> /L): <u>—</u>	Temperature (°C) of sample prior to aeration: <u>18</u> Is aeration required (<40% or >100%)? <input checked="" type="radio"/> Yes or <input type="radio"/> No Filtered with 110µm screen prior to testing <input checked="" type="radio"/> Yes or <input type="radio"/> No Is hardness adjustment required (<25 mg CaCO <sub>3</sub> /L)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
<b>Dilution Water</b> Pail label / preparation date <u>1:04/11</u> Hardness of dilution water (mg/L) <u>209</u>	<b>DO Levels (40-100% saturation) - corrected for altitude -</b> 3.3 to 8.2 mg/L at 18°C      3.1 to 7.7 mg/L at 21°C 3.2 to 8.1 mg/L at 19°C      3.0 to 7.6 mg/L at 22°C 3.2 to 7.9 mg/L at 20°C
<b>Comments/Observations:</b>	

Reviewed By: SS

Date Reviewed: 2022/04/18

**APPENDIX C – Chain-of-custody form**

---



Destination Lab: **Nautilus Environmental (Calgary)**  
Address: 10828 27 Street SE Calgary AB Canada T2Z 3V9  
Work Order Number: **EO2202394**  
Original Receipt Date/Time: 11/04/2022 14:45  
Instructions Received

Relinquished By  
Date/Time  
Received By  
Date/Time  
Receipt Temp

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

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
EO2202394-001	Pond B	Water	LDPE carboy			15-04-2022	11/04/2022 11:30	
EO2202394-001	Pond B	Water	LDPE carboy			15-04-2022	11/04/2022 11:30	
EO2202394-001	Pond B	Water	LDPE carboy			15-04-2022	11/04/2022 11:30	
EO2202394-001	Pond B	Water	LDPE carboy			15-04-2022	11/04/2022 11:30	
EO2202394-002	Pond C	Water	LDPE carboy			15-04-2022	11/04/2022 11:00	
EO2202394-002	Pond C	Water	LDPE carboy			15-04-2022	11/04/2022 11:00	
EO2202394-002	Pond C	Water	LDPE carboy			15-04-2022	11/04/2022 11:00	
EO2202394-002	Pond C	Water	LDPE carboy			15-04-2022	11/04/2022 11:00	
EO2202394-001	Pond B -01	Water	LDPE carboy	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	15-04-2022	11/04/2022 11:30	14.8°C
EO2202394-002	Pond C -02	Water	LDPE carboy	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	15-04-2022	11/04/2022 11:00	15.1°C
EO2202394-001	Pond B	Water	LDPE carboy	TRT-LC50-96	Survival/LC50 Rainbow Trout (96 hours)	15-04-2022	11/04/2022 11:30	
EO2202394-002	Pond C	Water	LDPE carboy	TRT-LC50-96	Survival/LC50 Rainbow Trout (96 hours)	15-04-2022	11/04/2022 11:00	

2122-1886  
2022/04/12  
16:00 oc  
Jazoo  
8x10L pails, 4x1L bottles  
NoS/NoB  
Good Condition

**END OF REPORT**

---





www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 966657

Page 1 of 1

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)

Report To: **Clean Harbors Canada**  
 Company: **Todd Todd, Stan Yuba**  
 Contact: **780 663-2513**  
 Phone: **Company address below will appear on the final report**  
 Street: **P.O. Box 390, 5014 Royce Road 173**  
 City/Province: **Edmonton, AB**  
 Postal Code: **T6R 4A0**  
 Invoice To:  Same as Report To  YES  NO  
 Copy of Invoice with Report:  YES  NO

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: **yuba.stan@cleanharbors.com**  
 Email 3:  
 Invoice Recipients:  EMAIL  MAIL  FAX  
 Select Invoice Distribution:  EMAIL  MAIL  FAX  
 Email 1 or Fax: **gooding@robby@cleanharbors.com**  
 Email 2:  
 Email 3:

Routing Code:  
 AFE/Coast Center:  
 Major/Minor Code:  
 Requisitioner:  
 Location:  
 ALS Contact: **Pamela Toledo**  
 Date: **11-Apr-22** Time: **11:30** Sample Type: **water**  
 Date: **11-Apr-22** Time: **11:00** Sample Type: **water**

Routing Code:  
 AFE/Coast Center:  
 Major/Minor Code:  
 Requisitioner:  
 Location:  
 ALS Contact: **Pamela Toledo**  
 Date: **11-Apr-22** Time: **11:30** Sample Type: **water**  
 Date: **11-Apr-22** Time: **11:00** Sample Type: **water**

ALS Account # / Quote #: **Q 82442 (Table 4.3B)**  
 Job #: **Pond B + C**  
 PO / AFE:  
 LSD: **Table 4.3B**  
 ALS Lab Work Order #: **ES 2202394**

Project Information  
 ALS Account # / Quote #: **Q 82442 (Table 4.3B)**  
 Job #: **Pond B + C**  
 PO / AFE:  
 LSD: **Table 4.3B**  
 ALS Lab Work Order #: **ES 2202394**

Project Information  
 ALS Account # / Quote #: **Q 82442 (Table 4.3B)**  
 Job #: **Pond B + C**  
 PO / AFE:  
 LSD: **Table 4.3B**  
 ALS Lab Work Order #: **ES 2202394**

Project Information  
 ALS Account # / Quote #: **Q 82442 (Table 4.3B)**  
 Job #: **Pond B + C**  
 PO / AFE:  
 LSD: **Table 4.3B**  
 ALS Lab Work Order #: **ES 2202394**

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

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

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

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

Drinking Water (DW) Samples (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)  
 Please analyze as per Table 4.3B + Daphnia (attached)  
 Quote Q 82442  
 Please rush analysis

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)  
 Please analyze as per Table 4.3B + Daphnia (attached)  
 Quote Q 82442  
 Please rush analysis

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)  
 Please analyze as per Table 4.3B + Daphnia (attached)  
 Quote Q 82442  
 Please rush analysis

SHIPMENT RELEASE (client use)  
 Released by: **[Signature]** Date: **Apr 11/2022** Time: **13:00**

SHIPMENT RELEASE (client use)  
 Released by: **[Signature]** Date: **Apr 11/2022** Time: **13:00**

SHIPMENT RELEASE (client use)  
 Released by: **[Signature]** Date: **Apr 11/2022** Time: **13:00**

SHIPMENT RELEASE (client use)  
 Released by: **[Signature]** Date: **Apr 11/2022** Time: **13:00**

INITIAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

INITIAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

INITIAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

INITIAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

FINAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

FINAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

FINAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

FINAL SHIPMENT RECEPTION (ALS use only)  
 Received by: **[Signature]** Date: **Apr 11/2022** Time: **2:24pm**

COOLING METHOD:  NONE  ICE  ICE PACKS  ROZIN  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: **6.1** FINAL COOLER TEMPERATURES °C:

COOLING METHOD:  NONE  ICE  ICE PACKS  ROZIN  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: **6.1** FINAL COOLER TEMPERATURES °C:

COOLING METHOD:  NONE  ICE  ICE PACKS  ROZIN  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: **6.1** FINAL COOLER TEMPERATURES °C:

COOLING METHOD:  NONE  ICE  ICE PACKS  ROZIN  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: **6.1** FINAL COOLER TEMPERATURES °C:

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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.

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

Environmental Division  
 Edmonton  
 Work Order Reference  
**EO2202394**  
 Telephone: +1 780 413 6227

Environmental Division  
 Edmonton  
 Work Order Reference  
**EO2202394**  
 Telephone: +1 780 413 6227

Environmental Division  
 Edmonton  
 Work Order Reference  
**EO2202394**  
 Telephone: +1 780 413 6227

Environmental Division  
 Edmonton  
 Work Order Reference  
**EO2202394**  
 Telephone: +1 780 413 6227

INDICATE FILTERED (F), PRESERVED (P) OR FILTERED AND PRESERVED (FP) BELOW

INDICATE FILTERED (F), PRESERVED (P) OR FILTERED AND PRESERVED (FP) BELOW

INDICATE FILTERED (F), PRESERVED (P) OR FILTERED AND PRESERVED (FP) BELOW

INDICATE FILTERED (F), PRESERVED (P) OR FILTERED AND PRESERVED (FP) BELOW

NUMBER OF CONTAINERS  
 Table 4.3B  
 Daphnia Mayra 48hr  
 Static acute lethality test

NUMBER OF CONTAINERS  
 Table 4.3B  
 Daphnia Mayra 48hr  
 Static acute lethality test

NUMBER OF CONTAINERS  
 Table 4.3B  
 Daphnia Mayra 48hr  
 Static acute lethality test

NUMBER OF CONTAINERS  
 Table 4.3B  
 Daphnia Mayra 48hr  
 Static acute lethality test

ANALYSIS REQUEST

ANALYSIS REQUEST

ANALYSIS REQUEST

ANALYSIS REQUEST

SAMPLES ON HOLD

SAMPLES ON HOLD

SAMPLES ON HOLD

SAMPLES ON HOLD

EXTENDED STORAGE REQUIRED

EXTENDED STORAGE REQUIRED

EXTENDED STORAGE REQUIRED

EXTENDED STORAGE REQUIRED

SUSPECTED HAZARD (see notes)

SUSPECTED HAZARD (see notes)

SUSPECTED HAZARD (see notes)

SUSPECTED HAZARD (see notes)

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

<b>PARAMETER</b>	<b>LIMITS</b> 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

48 hr Static Acute Lethality test using *Daphnia Magna*