

CERTIFICATE OF ANALYSIS

Work Order : **VA22B3589**
Client : **Lafarge Canada Inc.**
Contact : Louise Bantok
Address : 2300 Rogers Ave
 Coquitlam BC Canada V3K 5X6
Telephone : ----
Project : ----
PO : ----
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Carla Fuginski
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 13-Jun-2022 10:00
Date Analysis Commenced : 22-Jun-2022
Issue Date : 27-Jun-2022 14:22

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
µg/L	micrograms per litre
mg/L	milligrams per litre

<: 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				
(Matrix: Water)					VA1	VA2	VA3	VA4	VA5
Client sampling date / time					12-Jun-2022 13:28	12-Jun-2022 13:43	12-Jun-2022 13:58	12-Jun-2022 13:37	12-Jun-2022 13:33
Analyte	CAS Number	Method	LOR	Unit	VA22B3589-001	VA22B3589-002	VA22B3589-003	VA22B3589-004	VA22B3589-005
					Result	Result	Result	Result	Result
Physical Tests									
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L	102	102	104	102	103
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0096	0.0079	0.0108	0.0098	0.0090
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00115	0.00113	0.00116	0.00112	0.00108
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00184	0.00146	0.00179	0.00181	0.00150
barium, total	7440-39-3	E420	0.00010	mg/L	0.00571	0.00568	0.00571	0.00551	0.00532
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	0.0000325	<0.0000050	<0.0000050	0.0000095
calcium, total	7440-70-2	E420	0.050	mg/L	36.9	37.0	37.8	37.2	37.4
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000024	0.000025	0.000027	0.000024	0.000025
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
copper, total	7440-50-8	E420	0.00050	mg/L	0.00863	0.00874	0.0115	0.00811	0.00851
iron, total	7439-89-6	E420	0.010	mg/L	0.012	0.080	0.016	0.012	0.078
lead, total	7439-92-1	E420	0.000050	mg/L	0.000345	0.00144	0.000354	0.000420	0.000464
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L	2.31	2.26	2.29	2.28	2.31
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00116	0.00578	0.00157	0.00117	0.00659
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00628	0.00543	0.00690	0.00644	0.00535
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L	0.308	0.309	0.304	0.301	0.305
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00038	0.00037	0.00033	0.00040	0.00041
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000738	0.000622	0.000792	0.000638	0.000614
silicon, total	7440-21-3	E420	0.10	mg/L	2.10	2.06	2.11	2.05	2.11
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, total	7440-23-5	E420	0.050	mg/L	5.68	5.34	5.88	5.77	5.54



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	VA1	VA2	VA3	VA4	VA5
Client sampling date / time					12-Jun-2022 13:28	12-Jun-2022 13:43	12-Jun-2022 13:58	12-Jun-2022 13:37	12-Jun-2022 13:33	
Analyte	CAS Number	Method	LOR	Unit	VA22B3589-001	VA22B3589-002	VA22B3589-003	VA22B3589-004	VA22B3589-005	
					Result	Result	Result	Result	Result	
Total Metals										
strontium, total	7440-24-6	E420	0.00020	mg/L	0.152	0.153	0.152	0.149	0.156	
sulfur, total	7704-34-9	E420	0.50	mg/L	11.4	10.2	11.4	11.2	10.9	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000981	0.00116	0.00102	0.00100	0.000978	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00077	0.00066	0.00077	0.00074	0.00067	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0068	0.205	0.0232	0.0050	0.0967	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611B	1.0	µg/L	4.6	4.5	3.9	4.3	4.3	
bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
chloroform	67-66-3	E611B	1.0	µg/L	112	106	92.4	107	103	
dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
trihalomethanes [THMs], total	----	E611B	2.0	µg/L	117	110	96.3	111	107	
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%	96.9	95.3	95.1	97.8	98.1	
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%	102	100	103	104	104	

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



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	VA6	VA7	VA8	VA-DUP8	----
Client sampling date / time						12-Jun-2022 13:53	12-Jun-2022 13:48	12-Jun-2022 13:22	12-Jun-2022 13:22	----
Analyte	CAS Number	Method	LOR	Unit	VA22B3589-006	VA22B3589-007	VA22B3589-008	VA22B3589-009	-----	----
					Result	Result	Result	Result	-----	----
Physical Tests										
hardness (as CaCO ₃), from total Ca/Mg	----	EC100A	0.50	mg/L	103	104	99.3	99.6		----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0110	0.0108	0.0086	0.0105		----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00114	0.00115	0.00109	0.00108		----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00170	0.00180	0.00163	0.00159		----
barium, total	7440-39-3	E420	0.00010	mg/L	0.00548	0.00562	0.00496	0.00513		----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100		----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	0.000074	<0.000050	<0.000050		----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010		----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050		----
calcium, total	7440-70-2	E420	0.050	mg/L	37.4	37.8	36.0	36.1		----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000025	0.000024	0.000022	0.000023		----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	0.00056	<0.00050	<0.00050		----
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010		----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00703	0.0222	0.00282	0.00336		----
iron, total	7439-89-6	E420	0.010	mg/L	0.013	0.017	0.013	0.014		----
lead, total	7439-92-1	E420	0.000050	mg/L	0.000265	0.000906	0.000194	0.000281		----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010		----
magnesium, total	7439-95-4	E420	0.0050	mg/L	2.25	2.27	2.29	2.31		----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00132	0.00117	0.00662	0.00694		----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050		----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00648	0.00642	0.00579	0.00574		----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00115	0.00100	<0.00050	<0.00050		----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050		----
potassium, total	7440-09-7	E420	0.050	mg/L	0.303	0.304	0.293	0.296		----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00041	0.00035	0.00034	0.00034		----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000647	0.000716	0.000644	0.000527		----
silicon, total	7440-21-3	E420	0.10	mg/L	2.00	2.10	2.04	2.03		----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010		----
sodium, total	7440-23-5	E420	0.050	mg/L	5.69	5.92	7.03	6.97		----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.154	0.155	0.154	0.154		----



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	VA6	VA7	VA8	VA-DUP8	----
Client sampling date / time						12-Jun-2022 13:53	12-Jun-2022 13:48	12-Jun-2022 13:22	12-Jun-2022 13:22	----
Analyte	CAS Number	Method	LOR	Unit	VA22B3589-006	VA22B3589-007	VA22B3589-008	VA22B3589-009	-----	
					Result	Result	Result	Result	----	
Total Metals										
sulfur, total	7704-34-9	E420	0.50	mg/L	10.7	11.1	9.03	8.66	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.00100	0.000992	0.000987	0.00101	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00076	0.00078	0.00068	0.00069	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0142	0.0145	0.0047	0.0067	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
Volatile Organic Compounds [THMs]										
bromodichloromethane	75-27-4	E611B	1.0	µg/L	4.4	4.5	3.3	3.6	----	
bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----	
chloroform	67-66-3	E611B	1.0	µg/L	113	112	86.4	94.2	----	
dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	<1.0	<1.0	----	
trihalomethanes [THMs], total	----	E611B	2.0	µg/L	117	116	89.7	97.8	----	
Volatile Organic Compounds [THMs] Surrogates										
bromofluorobenzene, 4-	460-00-4	E611B	1.0	%	95.6	97.0	95.6	95.4	----	
difluorobenzene, 1,4-	540-36-3	E611B	1.0	%	104	101	105	103	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B3589	Page	: 1 of 9
Client	: Lafarge Canada Inc.	Laboratory	: Vancouver - Environmental
Contact	: Louise Bantok	Account Manager	: Carla Fuginski
Address	: 2300 Rogers Ave Coquitlam BC Canada V3K 5X6	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 13-Jun-2022 10:00
PO	: ----	Issue Date	: 27-Jun-2022 14:22
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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 Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- 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.

Page : 3 of 9
Work Order : VA22B3589
Client : Lafarge Canada Inc.
Project : ----



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Total Metals	QC-532567-002	----	tellurium, total	13494-80-9	E420	121 % ^{MES}	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier Description

MES *Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*



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	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA1	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA2	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA3	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA4	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA5	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA6	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✔
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA7	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 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	
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA8	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) VA-DUP8	E508	12-Jun-2022	----	----	----		22-Jun-2022	28 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA1	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA2	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA3	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA4	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA5	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA6	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA7	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✓



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

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA8	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✔
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) VA-DUP8	E420	12-Jun-2022	----	----	----		24-Jun-2022	180 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA1	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA2	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA3	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA4	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA5	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA6	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✔
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA7	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 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	
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA8	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium thiosulfate) VA-DUP8	E611B	12-Jun-2022	24-Jun-2022	----	----		24-Jun-2022	14 days	12 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)							
THMs by Headspace GC-MS	E611B	536900	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	534400	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	532567	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
THMs by Headspace GC-MS	E611B	536900	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	534400	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	532567	1	19	5.2	5.0	✓
Method Blanks (MB)							
THMs by Headspace GC-MS	E611B	536900	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	534400	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	532567	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
THMs by Headspace GC-MS	E611B	536900	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	534400	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	532567	1	19	5.2	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
Total Metals in Water by CRC ICPMS	E420 Vancouver - 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.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
THMs by Headspace GC-MS	E611B Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

QUALITY CONTROL REPORT

Work Order	: VA22B3589	Page	: 1 of 10
Client	: Lafarge Canada Inc.	Laboratory	: Vancouver - Environmental
Contact	: Louise Bantok	Account Manager	: Carla Fuginski
Address	: 2300 Rogers Ave Coquitlam BC Canada V3K 5X6	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 13-Jun-2022 10:00
PO	: ----	Date Analysis Commenced	: 22-Jun-2022
C-O-C number	: ----	Issue Date	: 27-Jun-2022 14:21
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer		
No. of samples received	: 9		
No. of samples analysed	: 9		

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>
Caleb Deroche	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 10
Work Order : VA22B3589
Client : Lafarge Canada Inc.
Project : ----



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
Total Metals (QC Lot: 532567)											
VA22B3211-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		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	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	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	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 532567) - continued											
VA22B3211-001	Anonymous	tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 534400)											
VA22B3581-014	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Volatile Organic Compounds [THMs] (QC Lot: 536900)											
VA22B3150-001	Anonymous	bromodichloromethane	75-27-4	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
		bromoform	75-25-2	E611B	1.0	µg/L	5.3	5.3	0.0%	30%	----
		chloroform	67-66-3	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----
		dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	0.0%	30%	----



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
Total Metals (QCLot: 532567)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
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	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 532567) - continued						
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	----
Total Metals (QCLot: 534400)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Volatile Organic Compounds [THMs] (QCLot: 536900)						
bromodichloromethane	75-27-4	E611B	1	µg/L	<1.0	----
bromoform	75-25-2	E611B	1	µg/L	<1.0	----
chloroform	67-66-3	E611B	1	µg/L	<1.0	----
dibromochloromethane	124-48-1	E611B	1	µg/L	<1.0	----



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
Total Metals (QCLot: 532567)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	110	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	117	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	112	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	109	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	96.1	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	108	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	111	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	114	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	107	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	108	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	112	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	112	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	115	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	113	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	115	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	110	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	112	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	114	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	111	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	# 121	80.0	120	MES
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	109	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.5	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	110	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 532567) - continued									
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	105	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	110	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	113	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Total Metals (QCLot: 534400)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	98.4	80.0	120	----
Volatile Organic Compounds [THMs] (QCLot: 536900)									
bromodichloromethane	75-27-4	E611B	1	µg/L	100 µg/L	93.9	70.0	130	----
bromoform	75-25-2	E611B	1	µg/L	100 µg/L	107	70.0	130	----
chloroform	67-66-3	E611B	1	µg/L	100 µg/L	92.3	70.0	130	----
dibromochloromethane	124-48-1	E611B	1	µg/L	100 µg/L	111	70.0	130	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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
Total Metals (QCLot: 532567)										
VA22B3211-002	Anonymous	aluminum, total	7429-90-5	E420	0.206 mg/L	0.2 mg/L	103	70.0	130	----
		antimony, total	7440-36-0	E420	0.0215 mg/L	0.02 mg/L	108	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		barium, total	7440-39-3	E420	0.0213 mg/L	0.02 mg/L	106	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		boron, total	7440-42-8	E420	0.106 mg/L	0.1 mg/L	106	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00438 mg/L	0.004 mg/L	109	70.0	130	----
		calcium, total	7440-70-2	E420	4.14 mg/L	4 mg/L	104	70.0	130	----
		cesium, total	7440-46-2	E420	0.0107 mg/L	0.01 mg/L	107	70.0	130	----
		chromium, total	7440-47-3	E420	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		copper, total	7440-50-8	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		iron, total	7439-89-6	E420	2.11 mg/L	2 mg/L	106	70.0	130	----
		lead, total	7439-92-1	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		magnesium, total	7439-95-4	E420	1.04 mg/L	1 mg/L	104	70.0	130	----
		manganese, total	7439-96-5	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0213 mg/L	0.02 mg/L	107	70.0	130	----
		nickel, total	7440-02-0	E420	0.0423 mg/L	0.04 mg/L	106	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.59 mg/L	10 mg/L	95.9	70.0	130	----
		potassium, total	7440-09-7	E420	4.36 mg/L	4 mg/L	109	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		selenium, total	7782-49-2	E420	0.0442 mg/L	0.04 mg/L	111	70.0	130	----
		silicon, total	7440-21-3	E420	10.4 mg/L	10 mg/L	104	70.0	130	----
		silver, total	7440-22-4	E420	0.00447 mg/L	0.004 mg/L	112	70.0	130	----
		sodium, total	7440-23-5	E420	2.14 mg/L	2 mg/L	107	70.0	130	----
		strontium, total	7440-24-6	E420	0.0222 mg/L	0.02 mg/L	111	70.0	130	----
		sulfur, total	7704-34-9	E420	21.0 mg/L	20 mg/L	105	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0444 mg/L	0.04 mg/L	111	70.0	130	----
		thallium, total	7440-28-0	E420	0.00423 mg/L	0.004 mg/L	106	70.0	130	----
		thorium, total	7440-29-1	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, total	7440-31-5	E420	0.0212 mg/L	0.02 mg/L	106	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
Total Metals (QCLot: 532567) - continued										
VA22B3211-002	Anonymous	titanium, total	7440-32-6	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		uranium, total	7440-61-1	E420	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, total	7440-62-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.437 mg/L	0.4 mg/L	109	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
Total Metals (QCLot: 534400)										
VA22B3589-001	VA1	mercury, total	7439-97-6	E508	0.0000984 mg/L	0.0001 mg/L	98.4	70.0	130	----
Volatile Organic Compounds [THMs] (QCLot: 536900)										
VA22B3589-001	VA1	bromodichloromethane	75-27-4	E611B	102 µg/L	100 µg/L	102	60.0	140	----
		bromoform	75-25-2	E611B	122 µg/L	100 µg/L	122	60.0	140	----
		chloroform	67-66-3	E611B	ND µg/L	100 µg/L	ND	60.0	140	----
		dibromochloromethane	124-48-1	E611B	119 µg/L	100 µg/L	119	60.0	140	----

TUN 8/22

① VAI - SITE #1 HOTEL 1:28PM

THM - SITE #1 HOTEL 1:28PM

② VAA - SITE #2 EARL ST 1:43PM

THM - SITE #2 EARL ST 1:43PM

③ VAB - SITE #3 MARBLE BAY @ VANANDA 1:58PM

THM - SITE #3 MARBLE BAY @ VANANDA 1:58PM

④ VAA - SITE #4 MARBLE BAY @ SILENTIA 1:37PM

THM - SITE #4 MARBLE BAY @ SILENTIA 1:37PM

⑤ VAS - SITE #5 SILENTIA @ STURT BAY 1:33PM

THM - SITE #5 SILENTIA @ STURT BAY 1:33PM

⑥ VAO - WALL ST PUMP HOUSE SITE #6 1:53PM

THM - SITE #6 WALL ST PUMP HOUSE 1:53PM

⑦ VAA - SITE #7 COPPERDUNE @ ALAIA 1:48PM

THM - SITE #7 COPPERDUNE @ ALAIA 1:48PM

⑧ VAB - SITE #8 TANK OUTLET 1:22PM

THM - SITE #8 TANK OUTLET 1:22PM

⑨ VAD - DUP SITE #8 TANK OUTLET 1:22PM

THM - SITE #8 TANK OUTLET 1:22PM

IT 5/13/22

10:00 AM 140

Environmental Division

Vancouver

Work Order Reference

VA22B3589



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