Bottom Ash Data

2024 Week 4

The following analytical report represents bottom ash composite results for week 4 of 2024 (January 21, 2024 to January 27, 2024).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24A1754**	Page	: 1 of 11
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 30-Jan-2024 13:20
PO	: VANCO0000052919	Date Analysis Commenced	: 31-Jan-2024
C-O-C number	: ----	Issue Date	: 02-Feb-2024 23:01
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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.

Signatories	*Position*	*Laboratory Department*
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	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).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
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: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2404-A-1	BA2404-A-2	BA2404-A-3	BA2404-A-4	BA2404-A-5
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
						VA24A1754-001	VA24A1754-002	VA24A1754-003	VA24A1754-004	VA24A1754-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.5	24.0	27.3	26.4	26.3
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.2	12.2	12.2	12.1
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		45300	46400	39400	32300	45400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		145	128	136	129	106
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.5	13.8	16.3	16.7	11.2
Barium	7440-39-3	E440/VA	0.50	mg/kg		581	626	664	469	755
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.44	0.44	0.41	0.39	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		22.4	7.90	8.27	12.6	6.79
Boron	7440-42-8	E440/VA	5.0	mg/kg		303	289	302	261	184
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		12.9	9.61	11.2	16.9	10.8
Calcium	7440-70-2	E440/VA	50	mg/kg		167000	163000	145000	177000	148000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		152	208	163	136	98.7
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		75.5	32.7	31.6	55.4	24.1
Copper	7440-50-8	E440/VA	0.50	mg/kg		2240	3790	1690	3820	2610
Iron	7439-89-6	E440/VA	50	mg/kg		51900	47700	39800	54900	46200
Lead	7439-92-1	E440/VA	0.50	mg/kg		306	270	289	377	346
Lithium	7439-93-2	E440/VA	2.0	mg/kg		27.6	24.3	23.6	27.0	27.2
Magnesium	7439-95-4	E440/VA	20	mg/kg		13300	12900	12100	13600	11500
Manganese	7439-96-5	E440/VA	1.0	mg/kg		841	1040	670	800	669
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.411	0.0645	0.123	0.0955	0.0774
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.2	17.2	15.3	18.1	17.6
Nickel	7440-02-0	E440/VA	0.50	mg/kg		235	177	281	149	112
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10700	11600	10800	10300	7850
Potassium	7440-09-7	E440/VA	100	mg/kg		8520	8090	6760	6940	6920
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.46	0.37	0.44	0.45	0.34
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.12	10.9	3.32	5.86	3.33
Sodium	7440-23-5	E440/VA	50	mg/kg		21000	21000	19100	17700	18500
Strontium	7440-24-6	E440/VA	0.50	mg/kg		335	551	307	386	299

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2404-A-1	BA2404-A-2	BA2404-A-3	BA2404-A-4	BA2404-A-5
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
						VA24A1754-001	VA24A1754-002	VA24A1754-003	VA24A1754-004	VA24A1754-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12000	10600	9500	13400	9500
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		163	98.1	111	140	102
Titanium	7440-32-6	E440/VA	1.0	mg/kg		309	331	295	195	286
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		7.95	6.48	4.49	9.91	4.38
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.43	3.34	3.12	3.78	2.91
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		38.7	39.0	34.6	39.2	34.7
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3640	3400	2890	4260	5330
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.8	3.7	3.8	5.0	5.3
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	12.1	12.0	12.1
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.89	9.30	8.93	8.96	9.28
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.91	2.91	2.91	2.91	2.91
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.81	7.54	7.19	7.54	7.28
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		2.27	2.33	2.30	2.18	2.60
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	0.096	0.064	0.084
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2210	2170	2130	2230	2380
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.197	0.448	0.379	0.522	0.859
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.910	0.812	0.903	0.919	1.09
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		117	120	126	115	140
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	0.29	<0.25	0.27
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2404-A-1	BA2404-A-2	BA2404-A-3	BA2404-A-4	BA2404-A-5
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1754-001	VA24A1754-002	VA24A1754-003	VA24A1754-004	VA24A1754-005
						Result	Result	Result	Result	Result
TCLP Metals										
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	1.22	4.00	0.84	3.87
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2404-A-6	BA2404-A-7	BA2404-A-8	BA2404-A-9	BA2404-A-10
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
						VA24A1754-006	VA24A1754-007	VA24A1754-008	VA24A1754-009	VA24A1754-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		26.1	25.3	25.2	27.4	27.2
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.1	12.2	12.2	12.2	12.2
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		41400	44200	41800	64700	47200
Antimony	7440-36-0	E440/VA	0.10	mg/kg		106	113	143	126	132
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		11.2	12.3	16.1	16.7	21.3
Barium	7440-39-3	E440/VA	0.50	mg/kg		630	662	504	607	667
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.39	0.39	0.40	0.39	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.76	9.61	9.70	8.89	7.74
Boron	7440-42-8	E440/VA	5.0	mg/kg		397	321	229	216	236
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		28.1	11.0	13.4	11.2	11.6
Calcium	7440-70-2	E440/VA	50	mg/kg		155000	158000	168000	170000	164000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		173	117	143	160	124
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		53.3	29.5	83.7	67.3	96.5
Copper	7440-50-8	E440/VA	0.50	mg/kg		1250	3100	1170	2610	1660
Iron	7439-89-6	E440/VA	50	mg/kg		39900	39000	62600	49000	39200
Lead	7439-92-1	E440/VA	0.50	mg/kg		513	273	373	370	381
Lithium	7439-93-2	E440/VA	2.0	mg/kg		34.9	25.0	40.4	54.3	29.9
Magnesium	7439-95-4	E440/VA	20	mg/kg		11100	12800	12900	13500	12400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		645	717	890	1200	2700
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.131	0.0807	0.0774	0.0758	0.0765
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		17.2	12.5	22.0	16.6	25.8
Nickel	7440-02-0	E440/VA	0.50	mg/kg		146	154	259	230	143
Phosphorus	7723-14-0	E440/VA	50	mg/kg		8630	10400	9840	10800	14000
Potassium	7440-09-7	E440/VA	100	mg/kg		6740	7310	6980	7290	7620
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.45	0.48	0.44	0.42	0.40
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.58	6.77	3.95	4.22	4.11
Sodium	7440-23-5	E440/VA	50	mg/kg		19000	20900	18600	19100	21000
Strontium	7440-24-6	E440/VA	0.50	mg/kg		323	306	348	338	315
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10500	10500	13500	12300	10600

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2404-A-6	BA2404-A-7	BA2404-A-8	BA2404-A-9	BA2404-A-10
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
						VA24A1754-006	VA24A1754-007	VA24A1754-008	VA24A1754-009	VA24A1754-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		99.9	113	138	115	126
Titanium	7440-32-6	E440/VA	1.0	mg/kg		233	236	265	374	290
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		4.54	5.31	8.35	4.88	6.49
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.16	3.30	3.43	3.34	3.54
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		34.3	37.5	39.1	39.9	43.5
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4220	3450	3560	3560	4570
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		4.6	3.9	3.3	6.3	4.4
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	12.0	12.1	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.40	9.34	9.74	9.67	9.37
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.91	2.91	2.91	2.91	2.91
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.67	7.42	7.34	7.57	6.83
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		2.25	2.47	2.28	2.21	2.23
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.068	0.079	0.084	0.213
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2160	2320	2090	2030	2120
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.315	0.438	0.426	0.310	0.658
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.807	1.00	0.853	0.937	1.15
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		118	127	120	119	124
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	0.47
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2404-A-6	BA2404-A-7	BA2404-A-8	BA2404-A-9	BA2404-A-10
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00	24-Jan-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1754-006	VA24A1754-007	VA24A1754-008	VA24A1754-009	VA24A1754-010
						Result	Result	Result	Result	Result
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	2.78	2.00	0.74	16.4
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2404-A-11	BA2404-A-12	----	----	----
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	----	----	----
						VA24A1754-011	VA24A1754-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.3	25.4	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.2	12.2	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		44900	35100	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		153	128	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		14.9	16.1	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		637	502	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.42	0.41	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		8.77	8.76	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		442	286	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		12.5	11.3	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		158000	162000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		129	133	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		21.0	30.2	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		1070	1880	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		41000	37500	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		258	445	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		24.3	23.7	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		13400	11900	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		704	666	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0784	0.0835	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		30.9	18.1	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		76.9	105	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10600	12700	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		7530	7400	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		1.12	0.39	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		6.61	6.64	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		20800	20000	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		317	337	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10800	12000	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2404-A-11	BA2404-A-12	----	----	----
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1754-011	VA24A1754-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		128	113	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		295	194	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		7.14	8.98	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.49	3.41	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		37.4	40.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3160	4550	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		4.6	5.0	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.1	12.0	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.45	9.34	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.91	2.91	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.33	7.17	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	----	----	----
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	----	----	----
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	----	----	----
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		2.30	2.69	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.165	0.077	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2150	2100	----	----	----
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L		0.332	0.560	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.875	0.908	----	----	----
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L		<5.0	<5.0	----	----	----
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L		125	126	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	0.27	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2404-A-11	BA2404-A-12	----	----	----
					Client sampling date / time	24-Jan-2024 09:00	24-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1754-011	VA24A1754-012	--------	--------	--------
						Result	Result	----	----	----
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	----	----	----
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	----	----	----
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	----	----	----
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		1.78	4.39	----	----	----
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24A1754**	Page	: 1 of 16
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 30-Jan-2024 13:20
PO	: VANCO0000052919	Issue Date	: 02-Feb-2024 23:01
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate 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.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24A1754-001	BA2404-A-1	Antimony	7440-36-0	E440	80.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Bismuth	7440-69-9	E440	89.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Lead	7439-92-1	E440	123 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Nickel	7440-02-0	E440	74.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Silver	7440-22-4	E440	54.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Titanium	7440-32-6	E440	45.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Tungsten	7440-33-7	E440	52.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Zinc	7440-66-6	E440	38.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1754-001	BA2404-A-1	Mercury	7439-97-6	E510	0.339 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

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: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-1	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-10	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-11	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-12	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-2	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-3	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-4	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-5	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-6	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-7	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-8	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2404-A-9	E510	24-Jan-2024	01-Feb-2024	28 days	8 days	✓	02-Feb-2024	28 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-1	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-10	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-11	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-12	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / 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*	
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-2	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-3	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-4	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-5	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-6	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-7	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-8	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2404-A-9	E440	24-Jan-2024	01-Feb-2024	180 days	8 days	✓	02-Feb-2024	180 days	10 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-1	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-10	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-11	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-12	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-2	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-3	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-4	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-5	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-6	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-7	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-8	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2404-A-9	E144	24-Jan-2024	----	----	----		31-Jan-2024	----	7 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-1	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-10	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-11	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-12	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-2	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-3	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-4	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-5	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-6	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-7	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-8	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2404-A-9	E108	24-Jan-2024	01-Feb-2024	30 days	8 days	✓	02-Feb-2024	30 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-1	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-10	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-11	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-12	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-2	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-3	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-4	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-5	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-6	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-7	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-8	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2404-A-9	E512	31-Jan-2024	02-Feb-2024	36 days	9 days	✓	02-Feb-2024	36 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-1	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-10	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-11	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-12	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-2	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-3	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-4	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-5	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-6	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-7	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-8	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2404-A-9	E444	31-Jan-2024	02-Feb-2024	188 days	9 days	✓	02-Feb-2024	188 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-1	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-10	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-11	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-12	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-2	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-3	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2404-A-4	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2404-A-5	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2404-A-6	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2404-A-7	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2404-A-8	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2404-A-9	EPP444	24-Jan-2024	31-Jan-2024	----	----		----	28 days	8 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: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1319012	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1319013	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1319015	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1319014	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1319012	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1319013	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	1319015	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1319014	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1321307	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1319012	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1321308	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1319013	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1319015	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1321307	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1321308	1	12	8.3	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 ALS Environmental - Vancouver	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Metals and Mercury	EP440 ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 ALS Environmental - Vancouver	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.

QUALITY CONTROL REPORT

Work Order	: **VA24A1754**	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 30-Jan-2024 13:20
PO	: VANCO0000052919	Date Analysis Commenced	: 31-Jan-2024
C-O-C number	: ----	Issue Date	: 02-Feb-2024 23:01
Sampler	: ---- ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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
- Reference Material (RM) 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.

Signatories	*Position*	*Laboratory Department*
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Organics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

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: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1319014)											
VA24A1754-001	BA2404-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.2	0.5%	5%	----
Physical Tests (QC Lot: 1319015)											
VA24A1754-001	BA2404-A-1	Moisture	----	E144	0.25	%	24.5	25.8	5.23%	20%	----
Metals (QC Lot: 1319012)											
VA24A1754-001	BA2404-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.411	# 0.0725	0.339	Diff <2x LOR	DUP-H,J
Metals (QC Lot: 1319013)											
VA24A1754-001	BA2404-A-1	Aluminum	7429-90-5	E440	50	mg/kg	45300	37600	18.5%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	145	341	80.3%	30%	DUP-H
		Arsenic	7440-38-2	E440	0.10	mg/kg	17.5	14.2	20.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	581	518	11.5%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.44	0.45	0.01	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	22.4	8.52	89.8%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	303	303	0.00566%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	12.9	11.6	10.5%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	167000	163000	2.74%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	152	165	8.22%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	75.5	64.1	16.4%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	2240	2320	3.52%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	51900	45300	13.5%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	306	1290	123%	40%	DUP-H
		Lithium	7439-93-2	E440	2.0	mg/kg	27.6	28.9	4.61%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	13300	12200	8.53%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	841	968	14.1%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	19.2	16.0	18.4%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	235	107	74.6%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	10700	9520	11.5%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	8520	7370	14.4%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.46	0.40	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	5.12	8.94	54.3%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	21000	19500	7.06%	40%	----

Sub-Matrix: **Soil/Solid**

					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*
Metals (QC Lot: 1319013) - continued											
VA24A1754-001	BA2404-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	335	349	4.10%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	12000	11400	4.74%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	163	120	30.3%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	309	195	45.4%	40%	DUP-H
		Tungsten	7440-33-7	E440	0.50	mg/kg	7.95	4.64	52.6%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	3.43	3.42	0.333%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	38.7	40.0	3.47%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3640	5360	38.2%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.8	4.2	0.3	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

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: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1319015)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1319012)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1319013)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1319013) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 1321307)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1321308)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	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: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1319014)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1319015)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1319012)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.0	80.0	120	----
Metals (QCLot: 1319013)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	108	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	106	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	103	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	107	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	117	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	110	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	109	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	118	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.8	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	109	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1319013) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	106	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	108	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	109	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	99.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	110	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	107	80.0	120	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 1321307)										
VA24A1754-001	BA2404-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.7	50.0	140	----
TCLP Metals (QCLot: 1321308)										
VA24A1754-001	BA2404-A-1	Antimony, TCLP	7440-36-0	E444	5.18 mg/L	5 mg/L	104	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.9 mg/L	5 mg/L	98.0	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.6 mg/L	12.5 mg/L	92.8	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.249 mg/L	0.25 mg/L	99.5	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.39 mg/L	10 mg/L	93.9	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.237 mg/L	0.25 mg/L	94.7	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.21 mg/L	1.25 mg/L	96.6	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	0.232 mg/L	0.25 mg/L	92.6	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.22 mg/L	2.5 mg/L	88.7	50.0	140	----
		Iron, TCLP	7439-89-6	E444	232 mg/L	250 mg/L	92.8	50.0	140	----
		Lead, TCLP	7439-92-1	E444	10.00 mg/L	10 mg/L	100.0	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	248 mg/L	250 mg/L	99.1	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.34 mg/L	2.5 mg/L	93.8	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.83 mg/L	5 mg/L	96.7	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.085 mg/L	0.1 mg/L	85.2	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	99.2	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	5.00 mg/L	5 mg/L	100	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.70 mg/L	0.75 mg/L	94.1	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.48 mg/L	10 mg/L	94.8	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	83.3	50.0	150	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1319012)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	96.9	70.0	130	----
Metals (QCLot: 1319013)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	115	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	106	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	111	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	106	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	121	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	131	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	107	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	113	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	120	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	109	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	105	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	108	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	107	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	111	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	122	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	112	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	101	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	124	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	109	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	104	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	104	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	120	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1319013) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	103	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	112	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	99.3	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	96.9	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To			
Company:	Covanta Energy		
Contact:	Nicole Victor / Dan Skrypnyk		
Address:	5150 Riverbend Drive		
	Burnaby BC		
Phone:	604-521-1025	Fax:	
		☐ Yes	☐ No

Report Format / Distribution				
☐ Standard	☐ Other			
☑ PDF	☐ Excel	☐ Digital	☐ Fax	
Email 1:	nvictor@covanta.com			
Email 2:	ofetherstonhaugh@covanta.com			
Email 3:	dskrypnyk@covanta.com			
	brent.kirkpatrick@metrovancouver.org			
	Sarah.Wellman@metrovancouver.org			

Service Requested (Rush for routine analysis subject to availability)
◉ Regular (Standard Turnaround Times - Business Days)
○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Invoice To	Same as Report ?		
Hardcopy of Invoice with Report?	☐ Yes	☐ No	
Company:			
Contact:			
Address:			
Phone:		Fax:	

Client / Project Information			
Job #:			
PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite		
LSD:	(includes 2:1 pH)		
Quote #:			
ALS Contact:		Sampler:	

Lab Work Order # (lab use only): A1754

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers
	BA2404-A-1	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-2	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-3	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-4	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-5	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-6	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-7	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-8	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-9	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-10	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-11	24-Jan-24	9:00	Soil	X	X		X	1
	BA2404-A-12	24-Jan-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A1754

Telephone : +1 604 253 4188

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

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 provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by: JL	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	30 Jan 24	500		JAN 30 2024	1320	19 °C				