Bottom Ash Data

2024 Week 17

The following analytical report represents bottom ash composite results for week 17 of 2024 (April 21, 2024 to April 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	: **VA24A9349**	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-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 30-Apr-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 10:40
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Analyst	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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		22.0	22.6	19.7	22.9	21.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.4	12.4	12.3	12.4
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		34500	31100	39800	34000	54000
Antimony	7440-36-0	E440/VA	0.10	mg/kg		132	137	123	131	137
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		22.2	23.9	22.3	23.3	23.6
Barium	7440-39-3	E440/VA	0.50	mg/kg		553	473	463	470	545
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.38	0.41	0.42	0.45	0.40
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		9.14	19.0	9.27	9.43	19.3
Boron	7440-42-8	E440/VA	5.0	mg/kg		194	206	229	176	184
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		8.06	10.0	9.42	11.0	8.74
Calcium	7440-70-2	E440/VA	50	mg/kg		145000	157000	156000	160000	157000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		138	184	179	143	593
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		51.8	61.1	43.7	28.0	51.7
Copper	7440-50-8	E440/VA	0.50	mg/kg		4720	3420	5890	4580	1800
Iron	7439-89-6	E440/VA	50	mg/kg		69000	46200	42700	51800	54000
Lead	7439-92-1	E440/VA	0.50	mg/kg		302	402	326	395	333
Lithium	7439-93-2	E440/VA	2.0	mg/kg		22.3	31.4	26.7	27.5	35.7
Magnesium	7439-95-4	E440/VA	20	mg/kg		11300	11900	11700	12600	13400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		733	865	688	833	840
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0968	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.9	27.8	23.3	28.8	30.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg		158	287	125	111	266
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9550	10000	8910	10300	9580
Potassium	7440-09-7	E440/VA	100	mg/kg		5050	5400	5400	5410	5780
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.36	0.50	0.37	0.39	0.46
Silver	7440-22-4	E440/VA	0.10	mg/kg		10.5	8.46	8.43	19.4	16.8
Sodium	7440-23-5	E440/VA	50	mg/kg		14700	16400	15400	15600	16500
Strontium	7440-24-6	E440/VA	0.50	mg/kg		282	318	328	313	324

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		13600	14800	14400	13400	14400
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		114	104	97.3	93.0	147
Titanium	7440-32-6	E440/VA	1.0	mg/kg		331	227	297	286	656
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		39.9	49.5	40.7	41.5	38.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.05	3.49	3.26	3.37	3.29
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		37.9	44.2	38.7	41.9	58.2
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3140	3470	4910	3580	3980
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.0	2.6	3.1	3.0	3.0
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.9	12.0	11.9	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.89	8.18	8.45	8.22	8.74
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.99	6.79	6.95	7.56	6.94
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		1.50	2.02	1.89	1.66	1.98
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.090	0.065	<0.050	0.064
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1530	1960	1820	1690	2010
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		0.762	0.697	0.759	0.254	0.552
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.428	0.563	0.442	0.626	0.565
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		91.7	113	103	96.2	115
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		0.27	0.31	<0.25	<0.25	<0.25
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						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		3.02	9.19	6.23	0.62	4.99
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		21.2	23.4	22.1	20.7	21.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	12.4	12.4	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		36700	46100	32800	37000	35400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		138	128	146	112	122
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		25.9	21.3	26.2	21.5	20.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		458	592	580	533	517
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.43	0.44	0.41	0.41	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		10.5	12.2	11.5	8.74	44.3
Boron	7440-42-8	E440/VA	5.0	mg/kg		203	254	201	227	171
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		10.6	9.38	11.3	8.74	8.70
Calcium	7440-70-2	E440/VA	50	mg/kg		156000	146000	163000	138000	134000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		170	212	171	182	144
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		48.3	106	81.3	57.6	130
Copper	7440-50-8	E440/VA	0.50	mg/kg		1340	3320	2640	2440	25700
Iron	7439-89-6	E440/VA	50	mg/kg		47200	44700	40700	54900	44300
Lead	7439-92-1	E440/VA	0.50	mg/kg		687	289	564	398	291
Lithium	7439-93-2	E440/VA	2.0	mg/kg		41.5	24.9	29.9	39.9	27.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		12200	13900	12300	11600	9940
Manganese	7439-96-5	E440/VA	1.0	mg/kg		732	950	779	692	734
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		80.3	24.4	27.4	23.5	22.1
Nickel	7440-02-0	E440/VA	0.50	mg/kg		126	121	184	199	182
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9750	8110	10300	8030	9040
Potassium	7440-09-7	E440/VA	100	mg/kg		6460	5480	6110	5470	5150
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.37	0.67	0.50	0.35	0.38
Silver	7440-22-4	E440/VA	0.10	mg/kg		15.1	5.65	11.0	9.98	7.50
Sodium	7440-23-5	E440/VA	50	mg/kg		16500	15400	16000	15600	14800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		330	310	350	291	280
Sulfur	7704-34-9	E440/VA	1000	mg/kg		15000	13100	14600	12900	12700

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						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		129	101	135	111	102
Titanium	7440-32-6	E440/VA	1.0	mg/kg		319	463	407	291	257
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		34.5	30.3	56.3	30.0	30.0
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.41	3.15	3.62	3.15	3.04
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		39.3	68.4	42.2	39.2	36.3
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4110	3190	4130	4150	2890
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.7	2.6	1.8	3.2	2.9
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	12.0	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.29	7.98	8.19	8.10	8.65
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.78	7.33	6.60	7.27	7.25
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		1.75	1.73	1.67	1.83	1.60
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.069	<0.050	0.079	0.057	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1690	1750	1740	1810	1600
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		1.07	0.350	1.56	0.587	0.443
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.406	0.394	0.549	0.541	0.414
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		102	99.9	105	100	88.8
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		0.34	<0.25	0.30	<0.25	<0.25
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						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		12.8	0.97	13.9	1.68	1.50
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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
						VA24A9349-011	VA24A9349-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		18.7	20.5	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		33400	39500	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		138	135	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		22.5	23.9	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		474	424	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.49	0.40	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		10.3	9.60	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		204	204	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		13.6	12.9	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		146000	145000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		131	172	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		55.8	48.7	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		1750	2720	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		47200	57400	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		359	416	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		27.8	25.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		11300	11600	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		666	799	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0593	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.8	27.3	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		167	110	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9180	8420	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		5360	5940	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.41	0.32	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.56	12.1	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		15500	16700	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		317	317	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		14600	13300	----	----	----

Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-011	VA24A9349-012	--------	--------	--------
						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	97.4	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		304	422	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		35.0	32.6	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.37	3.28	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		36.6	40.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4160	3220	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.5	2.8	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.40	8.41	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.08	6.73	----	----	----
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		1.63	1.72	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.077	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1610	1660	----	----	----
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		0.665	0.669	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.539	0.427	----	----	----
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		92.3	101	----	----	----
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		0.26	0.34	----	----	----
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-011	VA24A9349-012	--------	--------	--------
						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		3.69	9.25	----	----	----
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	: **VA24A9349**	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-Apr-2024 14:15
PO	: VANCO0000052919	Issue Date	: 07-May-2024 10:42
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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	VA24A9349-001	BA2417-A-1	Bismuth	7440-69-9	E440	34.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Chromium	7440-47-3	E440	51.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Copper	7440-50-8	E440	123 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Silver	7440-22-4	E440	59.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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 BA2417-A-1	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-10	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-11	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-12	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-2	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-3	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-4	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-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 BA2417-A-5	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-6	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-7	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-8	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-9	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-1	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-10	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-11	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-12	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-2	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-3	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-4	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-5	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-6	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-7	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-8	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-9	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-1	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 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*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-10	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-11	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-12	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-2	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-3	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-4	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-5	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-6	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-7	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 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 BA2417-A-8	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-9	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-1	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-10	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-11	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-12	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-2	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-3	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-4	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-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 BA2417-A-5	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-6	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-7	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-8	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-9	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-1	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-10	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-11	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-12	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 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) BA2417-A-2	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-3	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-4	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-5	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-6	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-7	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-8	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-9	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-1	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 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) BA2417-A-10	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-11	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-12	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-2	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-3	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-4	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-5	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-6	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-7	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 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) BA2417-A-8	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-9	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-1	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-10	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-11	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-12	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-2	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-3	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-4	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 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*	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-5	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-6	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-7	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-8	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-9	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 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 by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	1	16	6.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	1	16	6.2	5.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426154	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1426152	2	16	12.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	2	16	12.5	10.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426154	1	16	6.2	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	1	16	6.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	1	16	6.2	5.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	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	: **VA24A9349**	Page	: 1 of 12
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-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 30-Apr-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 10:40
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Analyst	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: 1426154)											
VA24A9349-001	BA2417-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.3	0.6%	5%	----
Physical Tests (QC Lot: 1426155)											
VA24A9349-001	BA2417-A-1	Moisture	----	E144	0.25	%	22.0	21.8	1.11%	20%	----
Metals (QC Lot: 1426152)											
VA24A9349-001	BA2417-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0968	<0.0500	0.0468	Diff <2x LOR	----
Metals (QC Lot: 1426153)											
VA24A9349-001	BA2417-A-1	Aluminum	7429-90-5	E440	50	mg/kg	34500	38700	11.4%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	132	126	5.23%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	22.2	29.8	29.2%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	553	550	0.540%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.41	0.03	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	9.14	12.9	34.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	194	230	17.0%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	8.06	9.26	13.8%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	145000	147000	1.40%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	138	236	51.9%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	51.8	41.4	22.3%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	4720	1120	123%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	69000	58400	16.7%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	302	327	7.90%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	22.3	23.5	5.21%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11300	12400	9.31%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	733	770	4.89%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	19.9	25.7	25.4%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	158	150	4.76%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	9550	7740	20.9%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5050	5240	3.78%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.31	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	10.5	5.66	59.9%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	14700	15900	7.70%	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: 1426153) - continued											
VA24A9349-001	BA2417-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	282	299	5.92%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13600	14000	3.29%	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	114	106	6.93%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	331	373	11.8%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	39.9	35.8	10.8%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.05	3.08	0.908%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	37.9	43.8	14.4%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3140	2930	6.80%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	0.2	Diff <2x LOR	----
TCLP Metals (QC Lot: 1426456)											
VA24A9349-001	BA2417-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1426457)											
VA24A9349-001	BA2417-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.50	1.60	0.10	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1530	1680	9.29%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.762	0.826	8.08%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.428	0.468	9.05%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	91.7	99.4	8.10%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.27	0.29	0.02	Diff <2x LOR	----
		Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	3.02	3.37	0.35	Diff <2x LOR	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

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: 1426155)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1426152)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1426153)						
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: 1426153) - 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: 1426456)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1426457)						
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	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1426154)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 1426155)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1426152)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 1426153)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	99.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	106	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.7	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	99.5	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.0	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	110	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1426153) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.7	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	103	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	115	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: 1426456)										
VA24A9349-001	BA2417-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	95.7	50.0	140	----
TCLP Metals (QCLot: 1426457)										
VA24A9349-001	BA2417-A-1	Antimony, TCLP	7440-36-0	E444	4.65 mg/L	5 mg/L	93.1	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.5 mg/L	5 mg/L	90.4	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.1 mg/L	12.5 mg/L	89.2	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.219 mg/L	0.25 mg/L	87.6	50.0	140	----
		Boron, TCLP	7440-42-8	E444	8.58 mg/L	10 mg/L	85.8	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.222 mg/L	0.25 mg/L	88.9	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.14 mg/L	1.25 mg/L	91.0	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.18 mg/L	2.5 mg/L	87.0	50.0	140	----
		Iron, TCLP	7439-89-6	E444	224 mg/L	250 mg/L	89.7	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.05 mg/L	10 mg/L	90.5	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	243 mg/L	250 mg/L	97.2	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.23 mg/L	2.5 mg/L	89.1	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.22 mg/L	5 mg/L	84.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.074 mg/L	0.1 mg/L	73.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.4 mg/L	5 mg/L	89.0	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.49 mg/L	5 mg/L	89.8	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	95.5	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.32 mg/L	10 mg/L	93.2	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	82.8	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: 1426152)									
QC-1426152-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1426153)									
QC-1426153-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	101	70.0	130	----
QC-1426153-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	89.2	70.0	130	----
QC-1426153-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	98.1	70.0	130	----
QC-1426153-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	109	70.0	130	----
QC-1426153-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	99.4	70.0	130	----
QC-1426153-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	82.0	70.0	130	----
QC-1426153-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	98.8	70.0	130	----
QC-1426153-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	96.2	70.0	130	----
QC-1426153-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	99.8	70.0	130	----
QC-1426153-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	85.0	70.0	130	----
QC-1426153-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	95.1	70.0	130	----
QC-1426153-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	94.8	70.0	130	----
QC-1426153-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.5	70.0	130	----
QC-1426153-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	96.0	70.0	130	----
QC-1426153-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	96.3	60.0	140	----
QC-1426153-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	89.0	70.0	130	----
QC-1426153-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	108	70.0	130	----
QC-1426153-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	99.6	70.0	130	----
QC-1426153-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	102	50.0	150	----
QC-1426153-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	85.3	70.0	130	----
QC-1426153-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	90.6	40.0	160	----
QC-1426153-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	100	70.0	130	----
QC-1426153-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	105	70.0	130	----
QC-1426153-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	90.9	70.0	130	----
QC-1426153-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	96.9	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: 1426153) - continued									
QC-1426153-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	96.6	70.0	130	----
QC-1426153-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	93.3	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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COC # _____

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Report To			
Company:	Covanta Energy		
Contact:	Nicole Victor / Dan Skrypnyk		
Address:	5150 Riverbend Drive		
	Burnaby BC		
Phone:	604-521-1025	Fax:	
		☐ Yes	☐ No
Invoice To	Same as Report ?		
Hardcopy of Invoice with Report?		☐ Yes	☐ No
Company:			
Contact:			
Address:			
Phone:		Fax:	
Lab Work Order # (lab use only)		A9349	

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	brent.kirkpatrick@metrovancouver.org			
	Sarah.Wellman@metrovancouver.org			

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

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

Analysis Request

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
1	BA2417-A-1	27-Apr-24	9:00	Soil	X	X		X	1
2	BA2417-A-2	27-Apr-24	9:00	Soil	X	X		X	1
3	BA2417-A-3	27-Apr-24	9:00	Soil	X	X		X	1
4	BA2417-A-4	27-Apr-24	9:00	Soil	X	X		X	1
5	BA2417-A-5	27-Apr-24	9:00	Soil	X	X		X	1
6	BA2417-A-6	27-Apr-24	9:00	Soil	X	X		X	1
7	BA2417-A-7	27-Apr-24	9:00	Soil	X	X		X	1
8	BA2417-A-8	27-Apr-24	9:00	Soil	X	X		X	1
9	BA2417-A-9	27-Apr-24	9:00	Soil	X	X		X	1
10	BA2417-A-10	27-Apr-24	9:00	Soil	X	X		X	1
11	BA2417-A-11	27-Apr-24	9:00	Soil	X	X		X	1
12	BA2417-A-12	27-Apr-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A9349

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:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	30-APR-24	0800	RK	4/30/24	1485	19,20 °C				

GENF 20.00 Front

CERTIFICATE OF ANALYSIS

Work Order	: **VA24A9355**	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-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 01-May-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 17:57
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, Burnaby, British Columbia
Russell Zhang	Analyst	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.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1_un processed	BA2417-A-2_un processed	BA2417-A-3_un processed	BA2417-A-4_un processed	BA2417-A-5_un processed
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
						VA24A9355-001	VA24A9355-002	VA24A9355-003	VA24A9355-004	VA24A9355-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		28.4	28.1	27.0	27.5	26.1
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.1	11.8	10.8	11.6	11.5
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		48600	36600	50300	60700	50600
Antimony	7440-36-0	E440/VA	0.10	mg/kg		132	122	163	152	141
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		23.3	16.6	25.4	20.1	22.4
Barium	7440-39-3	E440/VA	0.50	mg/kg		459	507	446	473	407
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.35	0.40	0.31	0.30	0.38
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		11.4	17.1	14.4	13.4	11.4
Boron	7440-42-8	E440/VA	5.0	mg/kg		169	202	180	161	221
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		8.87	8.09	12.7	10.2	9.73
Calcium	7440-70-2	E440/VA	50	mg/kg		137000	154000	148000	144000	146000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		157	190	324	151	154
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		161	45.0	93.3	50.6	61.6
Copper	7440-50-8	E440/VA	0.50	mg/kg		1490	2020	2360	5220	2900
Iron	7439-89-6	E440/VA	50	mg/kg		47000	36000	65700	37000	58300
Lead	7439-92-1	E440/VA	0.50	mg/kg		291	305	370	382	454
Lithium	7439-93-2	E440/VA	2.0	mg/kg		30.8	42.5	29.4	25.5	25.9
Magnesium	7439-95-4	E440/VA	20	mg/kg		11800	10900	11900	10500	11500
Manganese	7439-96-5	E440/VA	1.0	mg/kg		771	808	894	817	929
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	0.0714	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.9	23.8	34.5	22.4	88.2
Nickel	7440-02-0	E440/VA	0.50	mg/kg		248	87.9	265	203	275
Phosphorus	7723-14-0	E440/VA	50	mg/kg		11200	12600	11300	11000	8970
Potassium	7440-09-7	E440/VA	100	mg/kg		5880	5530	5730	6500	5480
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.37	0.33	0.46	0.38	0.50
Silver	7440-22-4	E440/VA	0.10	mg/kg		>61.8	7.45	8.96	10.4	17.4
Sodium	7440-23-5	E440/VA	50	mg/kg		17200	16200	16500	17800	16000
Strontium	7440-24-6	E440/VA	0.50	mg/kg		400	362	317	321	302

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1_un processed	BA2417-A-2_un processed	BA2417-A-3_un processed	BA2417-A-4_un processed	BA2417-A-5_un processed
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
						VA24A9355-001	VA24A9355-002	VA24A9355-003	VA24A9355-004	VA24A9355-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12800	12700	15900	15800	14700
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	0.051	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		114	108	129	118	114
Titanium	7440-32-6	E440/VA	1.0	mg/kg		552	267	591	564	477
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		48.8	36.8	45.4	72.7	32.8
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.28	3.20	3.51	3.53	4.02
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		40.7	42.3	45.7	44.8	42.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3660	2640	3630	4270	4870
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.2	2.9	3.3	4.9	3.1
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.8	11.7	11.6	11.8	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.93	6.36	5.31	5.57	6.24
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.68	6.76	6.41	6.98	6.95
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		1.66	1.85	1.78	1.73	2.20
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.091	0.053	0.109	0.055	0.069
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1860	1900	1790	1860	1920
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		1.89	0.764	0.899	0.750	0.897
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.779	0.534	0.838	0.376	0.522
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		106	108	111	105	107
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		0.41	0.32	0.44	0.40	0.36
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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1_un processed	BA2417-A-2_un processed	BA2417-A-3_un processed	BA2417-A-4_un processed	BA2417-A-5_un processed
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
						VA24A9355-001	VA24A9355-002	VA24A9355-003	VA24A9355-004	VA24A9355-005
						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		24.4	7.32	25.0	5.38	6.95
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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: BA2417-A-6_unprocessed	BA2417-A-7_unprocessed	BA2417-A-8_unprocessed	BA2417-A-9_unprocessed	BA2417-A-10_unprocessed
					Client sampling date / time: 24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
					VA24A9355-006	VA24A9355-007	VA24A9355-008	VA24A9355-009	VA24A9355-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	27.2	27.8	28.1	28.6	28.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.8	10.8	11.0	11.1	10.5
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	43300	40800	38500	45100	44000
Antimony	7440-36-0	E440/VA	0.10	mg/kg	114	127	126	131	145
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.6	20.8	19.0	19.2	18.6
Barium	7440-39-3	E440/VA	0.50	mg/kg	449	403	468	409	501
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.38	0.37	0.35	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.6	13.5	18.1	14.7	15.2
Boron	7440-42-8	E440/VA	5.0	mg/kg	162	180	181	233	208
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	8.13	9.42	8.24	11.6	26.4
Calcium	7440-70-2	E440/VA	50	mg/kg	142000	144000	132000	140000	138000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	214	184	249	131	348
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	53.5	52.6	176	37.0	120
Copper	7440-50-8	E440/VA	0.50	mg/kg	2290	1360	3610	1230	16600
Iron	7439-89-6	E440/VA	50	mg/kg	51500	42900	83100	62000	63200
Lead	7439-92-1	E440/VA	0.50	mg/kg	265	334	284	413	557
Lithium	7439-93-2	E440/VA	2.0	mg/kg	32.2	29.4	58.6	80.2	28.2
Magnesium	7439-95-4	E440/VA	20	mg/kg	11400	12100	10800	11100	11000
Manganese	7439-96-5	E440/VA	1.0	mg/kg	856	692	783	763	756
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.0552	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	19.8	25.2	23.4	17.1	27.5
Nickel	7440-02-0	E440/VA	0.50	mg/kg	162	172	178	151	2630
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9030	8500	6330	8610	7470
Potassium	7440-09-7	E440/VA	100	mg/kg	6260	6010	5470	5190	5410
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.39	0.46	0.45	0.50	0.45
Silver	7440-22-4	E440/VA	0.10	mg/kg	9.05	7.96	8.17	9.99	7.77
Sodium	7440-23-5	E440/VA	50	mg/kg	16600	16800	15400	14400	15200
Strontium	7440-24-6	E440/VA	0.50	mg/kg	281	272	271	269	272
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12800	14400	13700	14000	12700

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-6_unprocessed	BA2417-A-7_unprocessed	BA2417-A-8_unprocessed	BA2417-A-9_unprocessed	BA2417-A-10_unprocessed
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
						VA24A9355-006	VA24A9355-007	VA24A9355-008	VA24A9355-009	VA24A9355-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	0.053
Tin	7440-31-5	E440/VA	2.0	mg/kg		104	119	115	134	139
Titanium	7440-32-6	E440/VA	1.0	mg/kg		383	284	373	374	484
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		28.6	29.5	26.6	44.0	34.8
Uranium	7440-61-1	E440/VA	0.050	mg/kg		2.86	3.41	2.73	3.23	2.85
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		47.4	39.4	38.7	39.2	39.0
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3930	3740	3120	3550	8200
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.6	3.4	2.1	2.9	2.1
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.9	11.7	11.7	11.7
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.17	6.14	5.57	5.61	5.18
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.88	6.67	6.64	6.56	6.93
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		1.91	1.85	1.83	1.84	1.99
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.251	0.093	0.084	0.113	0.579
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1880	1800	1860	1880	1890
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		0.798	0.644	0.784	0.827	0.422
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.517	0.338	0.582	0.524	0.553
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		109	102	106	111	104
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		0.42	0.32	0.56	0.42	0.33
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-6_unprocessed	BA2417-A-7_unprocessed	BA2417-A-8_unprocessed	BA2417-A-9_unprocessed	BA2417-A-10_unprocessed
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00	24-Apr-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9355-006	VA24A9355-007	VA24A9355-008	VA24A9355-009	VA24A9355-010
						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		4.85	16.0	13.0	14.8	10.9
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: BA2417-A-11_unprocessed	BA2417-A-12_unprocessed	----	----	----
					Client sampling date / time: 24-Apr-2024 09:00	24-Apr-2024 09:00	----	----	----
					VA24A9355-011	VA24A9355-012	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
Moisture	----	E144/VA	0.25	%	29.4	28.1	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	10.7	10.4	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	32100	57100	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	151	129	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	24.7	18.2	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	364	459	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.35	0.33	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	18.9	11.4	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	165	458	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	13.5	8.78	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	154000	140000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	142	142	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	36.4	35.6	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	5130	1480	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	50800	62300	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	601	377	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	22.4	25.0	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11400	10700	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	820	820	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	24.9	46.9	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	124	155	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	11000	7640	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	6520	5030	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.54	0.43	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	12.1	17.2	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	18000	14600	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	294	266	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	16500	12600	----	----	----

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-11_unprocessed	BA2417-A-12_unprocessed	----	----	----
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	----	----	----
						VA24A9355-011	VA24A9355-012	--------	--------	--------
						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		142	103	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		244	587	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		42.1	48.7	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.79	3.01	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		42.1	38.5	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4630	3570	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		<1.5 DLM	3.6	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.7	11.4	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		5.32	5.05	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.89	6.68	----	----	----
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		2.01	1.82	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.066	0.097	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1980	1820	----	----	----
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		0.368	0.674	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.584	0.436	----	----	----
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		103	105	----	----	----
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		0.45	0.72	----	----	----
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-11_unprocessed	BA2417-A-12_unprocessed	----	----	----
					Client sampling date / time	24-Apr-2024 09:00	24-Apr-2024 09:00	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*		VA24A9355-011	VA24A9355-012	--------	--------	--------
						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		12.6	13.9	----	----	----
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	: **VA24A9355**	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-Apr-2024 14:15
PO	: VANCO0000052919	Issue Date	: 07-May-2024 17:59
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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	Anonymous	Anonymous	Bismuth	7440-69-9	E440	34.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Chromium	7440-47-3	E440	51.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Copper	7440-50-8	E440	123 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Silver	7440-22-4	E440	59.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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 BA2417-A-1_unprocessed	E510	24-Apr-2024	05-May-2024	28 days	11 days	✓	06-May-2024	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-2_unprocessed	E510	24-Apr-2024	05-May-2024	28 days	11 days	✓	06-May-2024	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-3_unprocessed	E510	24-Apr-2024	05-May-2024	28 days	11 days	✓	06-May-2024	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-4_unprocessed	E510	24-Apr-2024	05-May-2024	28 days	11 days	✓	06-May-2024	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-10_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-11_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-12_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 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 BA2417-A-5_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-6_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-7_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-8_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-9_unprocessed	E510	24-Apr-2024	07-May-2024	28 days	13 days	✓	07-May-2024	28 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-1_unprocessed	E440	24-Apr-2024	05-May-2024	180 days	11 days	✓	06-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-2_unprocessed	E440	24-Apr-2024	05-May-2024	180 days	11 days	✓	06-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-3_unprocessed	E440	24-Apr-2024	05-May-2024	180 days	11 days	✓	06-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-4_unprocessed	E440	24-Apr-2024	05-May-2024	180 days	11 days	✓	06-May-2024	180 days	13 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 BA2417-A-10_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-11_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-12_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-5_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-6_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-7_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-8_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-9_unprocessed	E440	24-Apr-2024	07-May-2024	180 days	13 days	✓	07-May-2024	180 days	13 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-1_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	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
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-10_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-11_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-12_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-2_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-3_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-4_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-5_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-6_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-7_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	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
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-8_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-9_unprocessed	E144	24-Apr-2024	----	----	----		02-May-2024	----	8 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-1_unprocessed	E108	24-Apr-2024	05-May-2024	30 days	11 days	✓	06-May-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-2_unprocessed	E108	24-Apr-2024	05-May-2024	30 days	11 days	✓	06-May-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-3_unprocessed	E108	24-Apr-2024	05-May-2024	30 days	11 days	✓	06-May-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-4_unprocessed	E108	24-Apr-2024	05-May-2024	30 days	11 days	✓	06-May-2024	30 days	12 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-10_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-11_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-12_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 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 BA2417-A-5_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-6_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-7_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-8_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-9_unprocessed	E108	24-Apr-2024	07-May-2024	30 days	13 days	✓	07-May-2024	30 days	13 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-1_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-10_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-11_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-12_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 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) BA2417-A-2_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-3_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-4_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-5_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-6_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-7_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-8_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-9_unprocessed	E512	01-May-2024	06-May-2024	36 days	12 days	✓	06-May-2024	36 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-1_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 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*	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-10_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-11_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-12_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-2_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-3_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-4_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-5_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-6_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-7_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 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) BA2417-A-8_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-9_unprocessed	E444	01-May-2024	06-May-2024	188 days	12 days	✓	06-May-2024	188 days	13 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-1_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-10_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-11_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-12_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-2_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-3_unprocessed	EPP444	24-Apr-2024	01-May-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) BA2417-A-4_unprocessed	EPP444	24-Apr-2024	01-May-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*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS)										
BA2417-A-5_unprocessed	EPP444	24-Apr-2024	01-May-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)										
BA2417-A-6_unprocessed	EPP444	24-Apr-2024	01-May-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)										
BA2417-A-7_unprocessed	EPP444	24-Apr-2024	01-May-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)										
BA2417-A-8_unprocessed	EPP444	24-Apr-2024	01-May-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)										
BA2417-A-9_unprocessed	EPP444	24-Apr-2024	01-May-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 by CVAAS (TCLP)	E512	1429495	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	2	31	6.4	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1429496	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426460	2	34	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1426464	2	31	6.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426461	2	34	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1426152	4	31	12.9	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426460	4	34	11.7	10.0	✓
Moisture Content by Gravimetry	E144	1426464	2	31	6.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426461	2	34	5.8	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1429495	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	2	31	6.4	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1429496	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426460	2	34	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1426464	2	31	6.4	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1429495	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1429496	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	: **VA24A9355**	Page	: 1 of 17
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-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 01-May-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 17:57
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Organics, Burnaby, British Columbia
Russell Zhang	Analyst	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: 1426154)											
VA24A9349-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.3	0.6%	5%	----
Physical Tests (QC Lot: 1426155)											
VA24A9349-001	Anonymous	Moisture	----	E144	0.25	%	22.0	21.8	1.11%	20%	----
Physical Tests (QC Lot: 1426461)											
VA24A9142-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.10	7.99	1.4%	5%	----
Physical Tests (QC Lot: 1426464)											
VA24A9142-001	Anonymous	Moisture	----	E144	0.25	%	21.0	20.1	4.79%	20%	----
Metals (QC Lot: 1426152)											
VA24A9349-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0968	<0.0500	0.0468	Diff <2x LOR	----
Metals (QC Lot: 1426153)											
VA24A9349-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	34500	38700	11.4%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	132	126	5.23%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	22.2	29.8	29.2%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	553	550	0.540%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.41	0.03	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	9.14	12.9	34.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	194	230	17.0%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	8.06	9.26	13.8%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	145000	147000	1.40%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	138	236	51.9%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	51.8	41.4	22.3%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	4720	1120	123%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	69000	58400	16.7%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	302	327	7.90%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	22.3	23.5	5.21%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11300	12400	9.31%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	733	770	4.89%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	19.9	25.7	25.4%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	158	150	4.76%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	9550	7740	20.9%	30%	----

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: 1426153) - continued											
VA24A9349-001	Anonymous	Potassium	7440-09-7	E440	100	mg/kg	5050	5240	3.78%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.31	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	10.5	5.66	59.9%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	14700	15900	7.70%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	282	299	5.92%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13600	14000	3.29%	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	114	106	6.93%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	331	373	11.8%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	39.9	35.8	10.8%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.05	3.08	0.908%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	37.9	43.8	14.4%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3140	2930	6.80%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	0.2	Diff <2x LOR	----
Metals (QC Lot: 1426459)											
VA24A9142-001	Anonymous	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0945	0.0794	17.3%	40%	----
Metals (QC Lot: 1426460)											
VA24A9142-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	21700	18400	16.1%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	1.69	1.46	14.5%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	1.72	1.64	4.98%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	61.2	56.2	8.53%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.10	<0.10	0.006	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	1.30	1.09	0.21	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.701	0.894	24.1%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	182000	228000	22.2%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	24.7	21.8	12.3%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	1.50	1.42	5.75%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	20.2	16.4	20.8%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	5690	5100	10.9%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	55.6	41.0	30.2%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	2.8	2.4	0.4	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	1870	2520	29.8%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	168	145	14.6%	30%	----

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: 1426460) - continued											
VA24A9142-001	Anonymous	Molybdenum	7439-98-7	E440	0.10	mg/kg	4.16	3.72	11.2%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	10.5	8.88	16.9%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	378	331	13.2%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	350	310	40	Diff <2x LOR	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.21	0.08	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	0.29	0.21	0.08	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	147	133	14	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	112	115	3.14%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		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	13.7	11.4	18.0%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	613	608	0.826%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.684	0.571	18.0%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	55.6	48.8	13.2%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	40.0	40.5	1.25%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	27.4	26.0	5.53%	30%	----
TCLP Metals (QC Lot: 1429495)											
VA24A9355-001	BA2417-A-1_unprocessed	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1429496)											
VA24A9355-001	BA2417-A-1_unprocessed	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.66	1.63	0.02	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.091	0.088	0.003	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1860	1780	4.13%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.89	1.86	1.46%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.779	0.768	1.33%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	106	105	0.759%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.41	0.41	0.003	Diff <2x LOR	----

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*
TCLP Metals (QC Lot: 1429496) - continued											
VA24A9355-001	BA2417-A-1_unprocessed	Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	24.4	24.0	1.56%	30%	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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: 1426155)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1426464)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1426152)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1426153)						
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	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1426153) - continued						
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----
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	----
Metals (QCLot: 1426459)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1426460)						
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	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1426460) - continued						
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	----
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: 1429495)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1429496)						
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	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1426154)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 1426155)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1426461)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 1426464)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1426152)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 1426153)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	99.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	106	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.7	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	99.5	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	100	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	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1426153) - continued									
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.0	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	110	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.7	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	103	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	115	80.0	120	----
Metals (QCLot: 1426459)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 1426460)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	107	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	98.8	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	99.9	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	101	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	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	103	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.2	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	106	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	106	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	103	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1426460) - continued									
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	90.0	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	100	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	111	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	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	102	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	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: 1429495)										
VA24A9355-001	BA2417-A-1_unprocessed	Mercury, TCLP	7439-97-6	E512	0.0008 mg/L	0.001 mg/L	80.8	50.0	140	----
TCLP Metals (QCLot: 1429496)										
VA24A9355-001	BA2417-A-1_unprocessed	Antimony, TCLP	7440-36-0	E444	4.98 mg/L	5 mg/L	99.6	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.3 mg/L	5 mg/L	107	50.0	140	----
		Barium, TCLP	7440-39-3	E444	13.8 mg/L	12.5 mg/L	110	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.254 mg/L	0.25 mg/L	102	50.0	140	----
		Boron, TCLP	7440-42-8	E444	10.5 mg/L	10 mg/L	105	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.248 mg/L	0.25 mg/L	99.1	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.29 mg/L	1.25 mg/L	103	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.35 mg/L	2.5 mg/L	94.1	50.0	140	----
		Iron, TCLP	7439-89-6	E444	252 mg/L	250 mg/L	101	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.46 mg/L	10 mg/L	94.6	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	263 mg/L	250 mg/L	105	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.50 mg/L	2.5 mg/L	100.0	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.16 mg/L	5 mg/L	103	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.083 mg/L	0.1 mg/L	82.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	97.5	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.85 mg/L	5 mg/L	97.1	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	103	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	ND mg/L	----	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.9 mg/L	1 mg/L	89.5	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: 1426152)									
QC-1426152-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1426153)									
QC-1426153-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	101	70.0	130	----
QC-1426153-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	89.2	70.0	130	----
QC-1426153-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	98.1	70.0	130	----
QC-1426153-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	109	70.0	130	----
QC-1426153-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	99.4	70.0	130	----
QC-1426153-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	82.0	70.0	130	----
QC-1426153-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	98.8	70.0	130	----
QC-1426153-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	96.2	70.0	130	----
QC-1426153-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	99.8	70.0	130	----
QC-1426153-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	85.0	70.0	130	----
QC-1426153-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	95.1	70.0	130	----
QC-1426153-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	94.8	70.0	130	----
QC-1426153-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.5	70.0	130	----
QC-1426153-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	96.0	70.0	130	----
QC-1426153-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	96.3	60.0	140	----
QC-1426153-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	89.0	70.0	130	----
QC-1426153-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	108	70.0	130	----
QC-1426153-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	99.6	70.0	130	----
QC-1426153-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	102	50.0	150	----
QC-1426153-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	85.3	70.0	130	----
QC-1426153-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	90.6	40.0	160	----
QC-1426153-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	100	70.0	130	----
QC-1426153-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	105	70.0	130	----
QC-1426153-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	90.9	70.0	130	----
QC-1426153-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	96.9	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1426153) - continued									
QC-1426153-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	96.6	70.0	130	----
QC-1426153-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	93.3	70.0	130	----
Metals (QCLot: 1426459)									
QC-1426459-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	104	70.0	130	----
Metals (QCLot: 1426460)									
QC-1426460-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	103	70.0	130	----
QC-1426460-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	104	70.0	130	----
QC-1426460-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	101	70.0	130	----
QC-1426460-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	99.4	70.0	130	----
QC-1426460-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	102	70.0	130	----
QC-1426460-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	96.9	70.0	130	----
QC-1426460-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	102	70.0	130	----
QC-1426460-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	105	70.0	130	----
QC-1426460-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	100	70.0	130	----
QC-1426460-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	101	70.0	130	----
QC-1426460-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	101	70.0	130	----
QC-1426460-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	104	70.0	130	----
QC-1426460-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	99.1	70.0	130	----
QC-1426460-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	98.8	70.0	130	----
QC-1426460-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	99.8	70.0	130	----
QC-1426460-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	104	70.0	130	----
QC-1426460-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	103	70.0	130	----
QC-1426460-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	102	70.0	130	----
QC-1426460-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	88.0	70.0	130	----
QC-1426460-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	102	70.0	130	----
QC-1426460-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	105	60.0	140	----
QC-1426460-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	98.5	70.0	130	----
QC-1426460-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	107	70.0	130	----
QC-1426460-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	108	70.0	130	----
QC-1426460-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	111	50.0	150	----
QC-1426460-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	98.6	70.0	130	----
QC-1426460-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	98.9	40.0	160	----
QC-1426460-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	111	70.0	130	----
QC-1426460-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	109	70.0	130	----
QC-1426460-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	92.2	70.0	130	----
QC-1426460-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	102	70.0	130	----
QC-1426460-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	100.0	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: 1426460) - continued									
QC-1426460-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	94.6	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 #:	

Lab Work Order # (lab use only): A9355

ALS Contact: | **Sampler:**

Analysis Request

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
	BA2417-A-1_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-2_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-3_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-4_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-5_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-6_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-7_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-8_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-9_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-10_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-11_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1
	BA2417-A-12_Unprocessed	24-Apr-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A9355

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:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	23-Apr-24	0900	RK	24/Apr/24	14:15	19.20 °C				

CERTIFICATE OF ANALYSIS

Work Order	: **VA24A9349**	Page	: 1 of 11
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
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Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 30-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 30-Apr-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 10:40
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Analyst	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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		22.0	22.6	19.7	22.9	21.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.4	12.4	12.3	12.4
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		34500	31100	39800	34000	54000
Antimony	7440-36-0	E440/VA	0.10	mg/kg		132	137	123	131	137
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		22.2	23.9	22.3	23.3	23.6
Barium	7440-39-3	E440/VA	0.50	mg/kg		553	473	463	470	545
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.38	0.41	0.42	0.45	0.40
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		9.14	19.0	9.27	9.43	19.3
Boron	7440-42-8	E440/VA	5.0	mg/kg		194	206	229	176	184
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		8.06	10.0	9.42	11.0	8.74
Calcium	7440-70-2	E440/VA	50	mg/kg		145000	157000	156000	160000	157000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		138	184	179	143	593
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		51.8	61.1	43.7	28.0	51.7
Copper	7440-50-8	E440/VA	0.50	mg/kg		4720	3420	5890	4580	1800
Iron	7439-89-6	E440/VA	50	mg/kg		69000	46200	42700	51800	54000
Lead	7439-92-1	E440/VA	0.50	mg/kg		302	402	326	395	333
Lithium	7439-93-2	E440/VA	2.0	mg/kg		22.3	31.4	26.7	27.5	35.7
Magnesium	7439-95-4	E440/VA	20	mg/kg		11300	11900	11700	12600	13400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		733	865	688	833	840
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0968	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.9	27.8	23.3	28.8	30.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg		158	287	125	111	266
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9550	10000	8910	10300	9580
Potassium	7440-09-7	E440/VA	100	mg/kg		5050	5400	5400	5410	5780
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.36	0.50	0.37	0.39	0.46
Silver	7440-22-4	E440/VA	0.10	mg/kg		10.5	8.46	8.43	19.4	16.8
Sodium	7440-23-5	E440/VA	50	mg/kg		14700	16400	15400	15600	16500
Strontium	7440-24-6	E440/VA	0.50	mg/kg		282	318	328	313	324

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		13600	14800	14400	13400	14400
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		114	104	97.3	93.0	147
Titanium	7440-32-6	E440/VA	1.0	mg/kg		331	227	297	286	656
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		39.9	49.5	40.7	41.5	38.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.05	3.49	3.26	3.37	3.29
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		37.9	44.2	38.7	41.9	58.2
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3140	3470	4910	3580	3980
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.0	2.6	3.1	3.0	3.0
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.9	12.0	11.9	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		7.89	8.18	8.45	8.22	8.74
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.99	6.79	6.95	7.56	6.94
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		1.50	2.02	1.89	1.66	1.98
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.090	0.065	<0.050	0.064
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1530	1960	1820	1690	2010
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		0.762	0.697	0.759	0.254	0.552
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.428	0.563	0.442	0.626	0.565
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		91.7	113	103	96.2	115
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		0.27	0.31	<0.25	<0.25	<0.25
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-1	BA2417-A-2	BA2417-A-3	BA2417-A-4	BA2417-A-5
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-001	VA24A9349-002	VA24A9349-003	VA24A9349-004	VA24A9349-005
						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		3.02	9.19	6.23	0.62	4.99
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/Solid
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		21.2	23.4	22.1	20.7	21.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	12.4	12.4	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		36700	46100	32800	37000	35400
Antimony	7440-36-0	E440/VA	0.10	mg/kg		138	128	146	112	122
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		25.9	21.3	26.2	21.5	20.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		458	592	580	533	517
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.43	0.44	0.41	0.41	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		10.5	12.2	11.5	8.74	44.3
Boron	7440-42-8	E440/VA	5.0	mg/kg		203	254	201	227	171
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		10.6	9.38	11.3	8.74	8.70
Calcium	7440-70-2	E440/VA	50	mg/kg		156000	146000	163000	138000	134000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		170	212	171	182	144
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		48.3	106	81.3	57.6	130
Copper	7440-50-8	E440/VA	0.50	mg/kg		1340	3320	2640	2440	25700
Iron	7439-89-6	E440/VA	50	mg/kg		47200	44700	40700	54900	44300
Lead	7439-92-1	E440/VA	0.50	mg/kg		687	289	564	398	291
Lithium	7439-93-2	E440/VA	2.0	mg/kg		41.5	24.9	29.9	39.9	27.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		12200	13900	12300	11600	9940
Manganese	7439-96-5	E440/VA	1.0	mg/kg		732	950	779	692	734
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		80.3	24.4	27.4	23.5	22.1
Nickel	7440-02-0	E440/VA	0.50	mg/kg		126	121	184	199	182
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9750	8110	10300	8030	9040
Potassium	7440-09-7	E440/VA	100	mg/kg		6460	5480	6110	5470	5150
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.37	0.67	0.50	0.35	0.38
Silver	7440-22-4	E440/VA	0.10	mg/kg		15.1	5.65	11.0	9.98	7.50
Sodium	7440-23-5	E440/VA	50	mg/kg		16500	15400	16000	15600	14800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		330	310	350	291	280
Sulfur	7704-34-9	E440/VA	1000	mg/kg		15000	13100	14600	12900	12700

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
						VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						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		129	101	135	111	102
Titanium	7440-32-6	E440/VA	1.0	mg/kg		319	463	407	291	257
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		34.5	30.3	56.3	30.0	30.0
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.41	3.15	3.62	3.15	3.04
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		39.3	68.4	42.2	39.2	36.3
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4110	3190	4130	4150	2890
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.7	2.6	1.8	3.2	2.9
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	12.0	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.29	7.98	8.19	8.10	8.65
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.78	7.33	6.60	7.27	7.25
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		1.75	1.73	1.67	1.83	1.60
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.069	<0.050	0.079	0.057	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1690	1750	1740	1810	1600
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		1.07	0.350	1.56	0.587	0.443
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.406	0.394	0.549	0.541	0.414
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		102	99.9	105	100	88.8
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		0.34	<0.25	0.30	<0.25	<0.25
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-6	BA2417-A-7	BA2417-A-8	BA2417-A-9	BA2417-A-10
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00	27-Apr-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-006	VA24A9349-007	VA24A9349-008	VA24A9349-009	VA24A9349-010
						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		12.8	0.97	13.9	1.68	1.50
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/Solid**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
						VA24A9349-011	VA24A9349-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		18.7	20.5	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		33400	39500	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		138	135	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		22.5	23.9	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		474	424	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.49	0.40	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		10.3	9.60	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		204	204	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		13.6	12.9	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		146000	145000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		131	172	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		55.8	48.7	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		1750	2720	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		47200	57400	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		359	416	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		27.8	25.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		11300	11600	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		666	799	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0593	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.8	27.3	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		167	110	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		9180	8420	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		5360	5940	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.41	0.32	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.56	12.1	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		15500	16700	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		317	317	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		14600	13300	----	----	----

Analytical Results

Sub-Matrix: Soil/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-011	VA24A9349-012	--------	--------	--------
						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	97.4	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		304	422	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		35.0	32.6	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.37	3.28	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		36.6	40.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4160	3220	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.5	2.8	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.40	8.41	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.84	2.84	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.08	6.73	----	----	----
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		1.63	1.72	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	0.077	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1610	1660	----	----	----
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		0.665	0.669	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.539	0.427	----	----	----
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		92.3	101	----	----	----
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		0.26	0.34	----	----	----
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2417-A-11	BA2417-A-12	----	----	----
					Client sampling date / time	27-Apr-2024 09:00	27-Apr-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A9349-011	VA24A9349-012	--------	--------	--------
						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		3.69	9.25	----	----	----
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	: **VA24A9349**	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-Apr-2024 14:15
PO	: VANCO0000052919	Issue Date	: 07-May-2024 10:42
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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	VA24A9349-001	BA2417-A-1	Bismuth	7440-69-9	E440	34.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Chromium	7440-47-3	E440	51.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Copper	7440-50-8	E440	123 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A9349-001	BA2417-A-1	Silver	7440-22-4	E440	59.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

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 BA2417-A-1	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-10	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-11	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-12	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-2	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-3	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-4	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-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 BA2417-A-5	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-6	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-7	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-8	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2417-A-9	E510	27-Apr-2024	05-May-2024	28 days	8 days	✓	06-May-2024	28 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-1	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-10	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-11	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-12	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-2	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-3	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-4	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-5	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-6	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-7	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-8	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2417-A-9	E440	27-Apr-2024	05-May-2024	180 days	8 days	✓	06-May-2024	180 days	10 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-1	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 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*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-10	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-11	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-12	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-2	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-3	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-4	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-5	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-6	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-7	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 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 BA2417-A-8	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2417-A-9	E144	27-Apr-2024	----	----	----		02-May-2024	----	5 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-1	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-10	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-11	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-12	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-2	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-3	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-4	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-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 BA2417-A-5	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-6	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-7	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-8	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2417-A-9	E108	27-Apr-2024	05-May-2024	30 days	8 days	✓	06-May-2024	30 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-1	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-10	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-11	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-12	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 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) BA2417-A-2	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-3	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-4	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-5	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-6	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-7	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-8	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2417-A-9	E512	30-Apr-2024	02-May-2024	31 days	5 days	✓	02-May-2024	31 days	5 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-1	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 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) BA2417-A-10	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-11	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-12	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-2	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-3	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-4	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-5	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-6	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-7	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 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) BA2417-A-8	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2417-A-9	E444	30-Apr-2024	02-May-2024	183 days	6 days	✓	03-May-2024	183 days	6 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-1	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-10	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-11	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-12	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-2	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-3	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-4	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 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*	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-5	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-6	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-7	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-8	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2417-A-9	EPP444	27-Apr-2024	30-Apr-2024	----	----		----	28 days	3 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 by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	1	16	6.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	1	16	6.2	5.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426154	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1426152	2	16	12.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	2	16	12.5	10.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1426154	1	16	6.2	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1426152	1	16	6.2	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1426153	1	16	6.2	5.0	✓
Moisture Content by Gravimetry	E144	1426155	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1426456	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1426457	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	: **VA24A9349**	Page	: 1 of 12
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-Apr-2024 14:15
PO	: VANCO0000052919	Date Analysis Commenced	: 30-Apr-2024
C-O-C number	: ----	Issue Date	: 07-May-2024 10:40
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Analyst	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: 1426154)											
VA24A9349-001	BA2417-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.3	0.6%	5%	----
Physical Tests (QC Lot: 1426155)											
VA24A9349-001	BA2417-A-1	Moisture	----	E144	0.25	%	22.0	21.8	1.11%	20%	----
Metals (QC Lot: 1426152)											
VA24A9349-001	BA2417-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0968	<0.0500	0.0468	Diff <2x LOR	----
Metals (QC Lot: 1426153)											
VA24A9349-001	BA2417-A-1	Aluminum	7429-90-5	E440	50	mg/kg	34500	38700	11.4%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	132	126	5.23%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	22.2	29.8	29.2%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	553	550	0.540%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.41	0.03	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	9.14	12.9	34.3%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	194	230	17.0%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	8.06	9.26	13.8%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	145000	147000	1.40%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	138	236	51.9%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	51.8	41.4	22.3%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	4720	1120	123%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	69000	58400	16.7%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	302	327	7.90%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	22.3	23.5	5.21%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11300	12400	9.31%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	733	770	4.89%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	19.9	25.7	25.4%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	158	150	4.76%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	9550	7740	20.9%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5050	5240	3.78%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.31	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	10.5	5.66	59.9%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	14700	15900	7.70%	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: 1426153) - continued											
VA24A9349-001	BA2417-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	282	299	5.92%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13600	14000	3.29%	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	114	106	6.93%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	331	373	11.8%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	39.9	35.8	10.8%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.05	3.08	0.908%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	37.9	43.8	14.4%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3140	2930	6.80%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	0.2	Diff <2x LOR	----
TCLP Metals (QC Lot: 1426456)											
VA24A9349-001	BA2417-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1426457)											
VA24A9349-001	BA2417-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	1.50	1.60	0.10	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1530	1680	9.29%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.762	0.826	8.08%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.428	0.468	9.05%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	91.7	99.4	8.10%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.27	0.29	0.02	Diff <2x LOR	----
		Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	3.02	3.37	0.35	Diff <2x LOR	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

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: 1426155)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1426152)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1426153)						
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: 1426153) - 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: 1426456)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1426457)						
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	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1426154)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 1426155)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1426152)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 1426153)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	99.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	106	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.7	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	99.5	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.0	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	110	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1426153) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.7	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	103	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	115	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: 1426456)										
VA24A9349-001	BA2417-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	95.7	50.0	140	----
TCLP Metals (QCLot: 1426457)										
VA24A9349-001	BA2417-A-1	Antimony, TCLP	7440-36-0	E444	4.65 mg/L	5 mg/L	93.1	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.5 mg/L	5 mg/L	90.4	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.1 mg/L	12.5 mg/L	89.2	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.219 mg/L	0.25 mg/L	87.6	50.0	140	----
		Boron, TCLP	7440-42-8	E444	8.58 mg/L	10 mg/L	85.8	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.222 mg/L	0.25 mg/L	88.9	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.14 mg/L	1.25 mg/L	91.0	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.18 mg/L	2.5 mg/L	87.0	50.0	140	----
		Iron, TCLP	7439-89-6	E444	224 mg/L	250 mg/L	89.7	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.05 mg/L	10 mg/L	90.5	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	243 mg/L	250 mg/L	97.2	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.23 mg/L	2.5 mg/L	89.1	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.22 mg/L	5 mg/L	84.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.074 mg/L	0.1 mg/L	73.8	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.4 mg/L	5 mg/L	89.0	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.49 mg/L	5 mg/L	89.8	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	95.5	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	9.32 mg/L	10 mg/L	93.2	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	82.8	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: 1426152)									
QC-1426152-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1426153)									
QC-1426153-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	101	70.0	130	----
QC-1426153-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	89.2	70.0	130	----
QC-1426153-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	98.1	70.0	130	----
QC-1426153-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	109	70.0	130	----
QC-1426153-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	99.4	70.0	130	----
QC-1426153-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	82.0	70.0	130	----
QC-1426153-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	98.8	70.0	130	----
QC-1426153-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	97.2	70.0	130	----
QC-1426153-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	96.2	70.0	130	----
QC-1426153-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	99.8	70.0	130	----
QC-1426153-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	85.0	70.0	130	----
QC-1426153-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	95.1	70.0	130	----
QC-1426153-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	94.8	70.0	130	----
QC-1426153-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	98.5	70.0	130	----
QC-1426153-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	92.3	70.0	130	----
QC-1426153-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	96.0	70.0	130	----
QC-1426153-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	96.5	70.0	130	----
QC-1426153-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	96.3	60.0	140	----
QC-1426153-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	89.0	70.0	130	----
QC-1426153-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	108	70.0	130	----
QC-1426153-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	99.6	70.0	130	----
QC-1426153-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	102	50.0	150	----
QC-1426153-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	85.3	70.0	130	----
QC-1426153-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	90.6	40.0	160	----
QC-1426153-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	100	70.0	130	----
QC-1426153-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	105	70.0	130	----
QC-1426153-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	90.9	70.0	130	----
QC-1426153-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	96.9	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: 1426153) - continued									
QC-1426153-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	96.6	70.0	130	----
QC-1426153-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	93.3	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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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
Invoice To	Same as Report ?		
Hardcopy of Invoice with Report?		☐ Yes	☐ No
Company:			
Contact:			
Address:			
Phone:		Fax:	
Lab Work Order # (lab use only)		A9349	

Report Format / Distribution				
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	brent.kirkpatrick@metrovancouver.org			
	Sarah.Wellman@metrovancouver.org			

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

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

Analysis Request

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
1	BA2417-A-1	27-Apr-24	9:00	Soil	X	X		X	1
2	BA2417-A-2	27-Apr-24	9:00	Soil	X	X		X	1
3	BA2417-A-3	27-Apr-24	9:00	Soil	X	X		X	1
4	BA2417-A-4	27-Apr-24	9:00	Soil	X	X		X	1
5	BA2417-A-5	27-Apr-24	9:00	Soil	X	X		X	1
6	BA2417-A-6	27-Apr-24	9:00	Soil	X	X		X	1
7	BA2417-A-7	27-Apr-24	9:00	Soil	X	X		X	1
8	BA2417-A-8	27-Apr-24	9:00	Soil	X	X		X	1
9	BA2417-A-9	27-Apr-24	9:00	Soil	X	X		X	1
10	BA2417-A-10	27-Apr-24	9:00	Soil	X	X		X	1
11	BA2417-A-11	27-Apr-24	9:00	Soil	X	X		X	1
12	BA2417-A-12	27-Apr-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A9349

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:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	30-APR-24	0800	RK	4/30/24	1485	19,20 °C				

GENF 20.00 Front