Bottom Ash Data

2023 Week 30

The following analytical report represents bottom ash composite results for week 30 of 2023 (July 23, 2023 to July 29, 2023).

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	: **VA23B7595**	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	: 31-Jul-2023 12:15
PO	: VANCO0000051998	Date Analysis Commenced	: 02-Aug-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 13:48
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
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
Owen Cheng		Metals, Burnaby, British Columbia

General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

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

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

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2330-A-1	BA2330-A-2	BA2330-A-3	BA2330-A-4	BA2330-A-5
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
						VA23B7595-001	VA23B7595-002	VA23B7595-003	VA23B7595-004	VA23B7595-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.4	23.9	25.2	24.1	23.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.2	12.2	12.3	12.3	12.2
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		37000	34200	47800	37500	32800
Antimony	7440-36-0	E440/VA	0.10	mg/kg		120	119	166	142	134
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		26.6	25.3	28.7	38.2	28.9
Barium	7440-39-3	E440/VA	0.50	mg/kg		608	574	603	506	487
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.36	<0.71	0.36	0.35	0.38
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		6.97	13.0	19.7	8.11	9.70
Boron	7440-42-8	E440/VA	5.0	mg/kg		167	196	184	156	194
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		45.4	13.5	13.3	16.9	34.5
Calcium	7440-70-2	E440/VA	50	mg/kg		167000	142000	175000	174000	172000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		166	217	300	220	201
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		46.6	249	80.4	90.8	81.6
Copper	7440-50-8	E440/VA	0.50	mg/kg		1820	52800	2050	4770	7170
Iron	7439-89-6	E440/VA	50	mg/kg		77800	73100	68600	67700	69100
Lead	7439-92-1	E440/VA	0.50	mg/kg		351	921	342	5340	459
Lithium	7439-93-2	E440/VA	2.0	mg/kg		22.0	32.3	23.9	25.3	22.8
Magnesium	7439-95-4	E440/VA	20	mg/kg		12000	11800	12900	12300	11800
Manganese	7439-96-5	E440/VA	1.0	mg/kg		920	795	1050	864	1010
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.138	0.126	0.161	0.0997	0.124
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		15.9	22.9	23.2	18.4	16.9
Nickel	7440-02-0	E440/VA	0.50	mg/kg		127	182	192	160	152
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10400	9990	10800	11200	10800
Potassium	7440-09-7	E440/VA	100	mg/kg		5670	5390	5660	5640	5960
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.76	<1.41	0.98	0.91	0.76
Silver	7440-22-4	E440/VA	0.10	mg/kg		8.58	9.41	6.62	>40.9	6.61
Sodium	7440-23-5	E440/VA	50	mg/kg		15700	16000	16000	15600	16700
Strontium	7440-24-6	E440/VA	0.50	mg/kg		464	320	349	366	367
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11500	9600	12200	11800	10700

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2330-A-1	BA2330-A-2	BA2330-A-3	BA2330-A-4	BA2330-A-5
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
						VA23B7595-001	VA23B7595-002	VA23B7595-003	VA23B7595-004	VA23B7595-005
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.353	<0.050	0.051	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		114	109	136	1560	168
Titanium	7440-32-6	E440/VA	1.0	mg/kg		213	315	299	266	207
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		19.6	20.6	34.9	21.8	18.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.52	3.72	3.76	3.72	3.55
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		42.2	39.9	50.3	45.0	43.9
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4160	18000	4480	4990	4600
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.9	<7.1	3.4	2.9	3.0
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	11.9	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		6.41	6.44	7.19	6.57	7.20
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.33	6.37	6.42	6.09	6.21
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		2.14	2.10	2.05	2.04	2.13
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.159	0.170	0.161	0.192	0.160
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2530	2470	2520	2430	2520
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		0.999	1.57	1.17	1.77	5.00
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		1.04	0.841	0.903	0.531	0.958
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		150	154	154	148	147
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		0.56	0.53	0.50	0.59	0.53
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
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2330-A-1	BA2330-A-2	BA2330-A-3	BA2330-A-4	BA2330-A-5
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B7595-001	VA23B7595-002	VA23B7595-003	VA23B7595-004	VA23B7595-005
						Result	Result	Result	Result	Result
TCLP Metals										
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		26.5	28.8	22.7	25.2	34.5
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L		<10	<10	<10	<10	<10

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

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

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2330-A-6	BA2330-A-7	BA2330-A-8	BA2330-A-9	BA2330-A-10
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
						VA23B7595-006	VA23B7595-007	VA23B7595-008	VA23B7595-009	VA23B7595-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.2	24.7	23.1	23.1	24.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.2	12.4	12.4	12.2	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		29100	42400	38800	36200	33700
Antimony	7440-36-0	E440/VA	0.10	mg/kg		111	257	126	134	125
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		25.2	26.6	25.0	23.7	27.2
Barium	7440-39-3	E440/VA	0.50	mg/kg		436	581	590	588	558
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		<0.70	0.38	0.40	0.36	0.35
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		33.8	6.88	7.17	10.2	6.68
Boron	7440-42-8	E440/VA	5.0	mg/kg		203	151	172	181	178
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		28.3	13.8	12.8	12.2	15.1
Calcium	7440-70-2	E440/VA	50	mg/kg		148000	178000	163000	165000	174000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		224	250	230	1190	449
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		234	68.6	71.4	98.8	153
Copper	7440-50-8	E440/VA	0.50	mg/kg		3040	3460	7680	7260	3620
Iron	7439-89-6	E440/VA	50	mg/kg		57400	57200	74100	84200	80800
Lead	7439-92-1	E440/VA	0.50	mg/kg		538	1410	415	307	418
Lithium	7439-93-2	E440/VA	2.0	mg/kg		30.4	27.5	24.0	32.5	25.6
Magnesium	7439-95-4	E440/VA	20	mg/kg		11100	12200	12100	12200	12400
Manganese	7439-96-5	E440/VA	1.0	mg/kg		791	1070	867	1440	973
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.115	0.188	0.154	0.120	0.134
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		29.8	23.9	15.6	153	17.7
Nickel	7440-02-0	E440/VA	0.50	mg/kg		228	151	195	860	245
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10100	11400	9300	9730	10100
Potassium	7440-09-7	E440/VA	100	mg/kg		5160	5900	5690	5780	5680
Selenium	7782-49-2	E440/VA	0.20	mg/kg		<1.40	0.91	0.78	0.82	1.20
Silver	7440-22-4	E440/VA	0.10	mg/kg		10.3	6.77	5.40	7.78	7.46
Sodium	7440-23-5	E440/VA	50	mg/kg		15200	16600	15900	17300	15800
Strontium	7440-24-6	E440/VA	0.50	mg/kg		320	349	321	324	365
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10400	12300	11700	12200	12000
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.349	<0.050	<0.050	<0.050	<0.050

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2330-A-6	BA2330-A-7	BA2330-A-8	BA2330-A-9	BA2330-A-10
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
						VA23B7595-006	VA23B7595-007	VA23B7595-008	VA23B7595-009	VA23B7595-010
						Result	Result	Result	Result	Result
Metals										
Tin	7440-31-5	E440/VA	2.0	mg/kg		316	140	124	111	149
Titanium	7440-32-6	E440/VA	1.0	mg/kg		172	254	246	308	227
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		17.8	24.3	26.5	22.8	19.0
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.71	3.78	3.45	3.52	3.85
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		43.7	44.5	45.5	45.4	43.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg		27500	4110	4480	6370	3780
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		<7.0	2.5	3.3	1.9	1.9
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.0	11.9	12.0	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.04	8.63	7.70	8.21	7.24
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.62	6.48	6.24	6.20	6.27
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L		<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L		2.12	2.17	2.11	2.16	2.20
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.115	0.312	0.180	0.166	0.181
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2440	2560	2460	2500	2490
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		0.740	1.17	0.892	1.53	1.23
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.818	0.843	0.907	1.50	1.03
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		138	155	149	146	146
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	0.54	0.50	0.59	0.62
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
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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2330-A-6	BA2330-A-7	BA2330-A-8	BA2330-A-9	BA2330-A-10
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00	26-Jul-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B7595-006	VA23B7595-007	VA23B7595-008	VA23B7595-009	VA23B7595-010
						Result	Result	Result	Result	Result
TCLP Metals										
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		10.7	20.5	31.0	27.3	43.9
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**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2330-A-11	BA2330-A-12	----	----	----
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	----	----	----
						VA23B7595-011	VA23B7595-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.4	24.4	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.4	12.3	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		35600	37900	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		158	142	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		30.8	30.2	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		582	542	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.45	0.34	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		7.98	8.08	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		159	156	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		14.8	15.7	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		176000	176000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		1640	192	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		104	158	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		5200	6180	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		78100	71500	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		387	1280	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		29.5	27.1	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		12300	12400	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1600	970	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.152	0.112	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		232	21.2	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		2140	248	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10600	11200	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		5640	5620	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.98	1.01	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		8.06	6.19	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		15700	15600	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		351	349	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12300	12400	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2330-A-11	BA2330-A-12	----	----	----
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B7595-011	VA23B7595-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
Tin	7440-31-5	E440/VA	2.0	mg/kg		161	259	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		262	446	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		32.8	27.7	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		3.89	3.83	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		51.8	44.2	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		5350	5440	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.4	2.7	----	----	----
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		8.26	7.74	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.89	2.89	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		6.71	6.40	----	----	----
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		2.38	2.15	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.113	0.474	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2640	2460	----	----	----
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		0.648	1.31	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.853	0.912	----	----	----
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		140	150	----	----	----
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		0.44	0.48	----	----	----
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	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2330-A-11	BA2330-A-12	----	----	----
					Client sampling date / time	26-Jul-2023 09:00	26-Jul-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA23B7595-011	VA23B7595-012	--------	--------	--------
						Result	Result	----	----	----
TCLP Metals										
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		10.3	19.5	----	----	----
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	: **VA23B7595**	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	: 31-Jul-2023 12:15
PO	: VANCO0000051998	Issue Date	: 08-Aug-2023 13:46
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA23B7595-001	BA2330-A-1	Cadmium	7440-43-9	E440	107 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Cobalt	7440-48-4	E440	85.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Copper	7440-50-8	E440	139 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Lithium	7439-93-2	E440	31.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Nickel	7440-02-0	E440	89.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Silver	7440-22-4	E440	52.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Tin	7440-31-5	E440	149 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA23B7595-001	BA2330-A-1	Tungsten	7440-33-7	E440	36.6 % DUP-H	30%	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 / 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 BA2330-A-1	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-10	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-11	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-12	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-2	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-3	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-4	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / 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 BA2330-A-5	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-6	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-7	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-8	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2330-A-9	E510	26-Jul-2023	04-Aug-2023	28 days	9 days	✓	05-Aug-2023	19 days	1 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-1	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-10	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-11	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-12	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / 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 BA2330-A-2	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-3	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-4	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-5	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-6	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-7	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-8	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2330-A-9	E440	26-Jul-2023	04-Aug-2023	180 days	9 days	✓	08-Aug-2023	171 days	4 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-1	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	

Matrix: **Soil/Solid**

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

Analyte Group / 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 BA2330-A-10	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-11	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-12	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-2	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-3	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-4	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-5	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-6	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-7	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	

Matrix: **Soil/Solid**

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

Analyte Group / 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 BA2330-A-8	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2330-A-9	E144	26-Jul-2023	----	----	----		03-Aug-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-1	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-10	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-11	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-12	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-2	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-3	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2330-A-4	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2330-A-5	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2330-A-6	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2330-A-7	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2330-A-8	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag										
BA2330-A-9	E108	26-Jul-2023	04-Aug-2023	30 days	9 days	✓	04-Aug-2023	21 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2330-A-1	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2330-A-10	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2330-A-11	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved)										
BA2330-A-12	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / 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) BA2330-A-2	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-3	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-4	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-5	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-6	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-7	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-8	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2330-A-9	E512	02-Aug-2023	04-Aug-2023	35 days	9 days	✓	04-Aug-2023	26 days	0 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-1	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / 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) BA2330-A-10	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-11	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-12	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-2	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-3	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-4	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-5	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-6	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-7	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / 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) BA2330-A-8	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2330-A-9	E444	02-Aug-2023	03-Aug-2023	187 days	8 days	✓	04-Aug-2023	179 days	1 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-1	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-10	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-11	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-12	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-2	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-3	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-4	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-5	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-6	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-7	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-8	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2330-A-9	EPP444	26-Jul-2023	02-Aug-2023	----	----		----	28 days	7 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1069993	1	17	5.8	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1069994	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1069995	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1069992	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1069993	2	17	11.7	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1069994	2	17	11.7	10.0	✓
Moisture Content by Gravimetry	E144	1069995	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1069992	1	18	5.5	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1070111	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1069993	1	17	5.8	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1070112	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1069994	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1069995	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1070111	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1070112	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.

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QUALITY CONTROL REPORT

Work Order	: **VA23B7595**	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Ian Chen
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	:	Telephone	: +1 604 253 4188
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 31-Jul-2023 12:15
PO	: VANCO0000051998	Date Analysis Commenced	: 02-Aug-2023
C-O-C number	: ----	Issue Date	: 08-Aug-2023 13:46
Sampler	: ---- ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
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
Owen Cheng		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: 1069992)											
VA23B7595-001	BA2330-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.2	12.2	0.7%	5%	----
Physical Tests (QC Lot: 1069995)											
VA23B7595-001	BA2330-A-1	Moisture	----	E144	0.25	%	24.4	23.3	4.46%	20%	----
Metals (QC Lot: 1069993)											
VA23B7595-001	BA2330-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.138	0.122	0.0164	Diff <2x LOR	----
Metals (QC Lot: 1069994)											
VA23B7595-001	BA2330-A-1	Aluminum	7429-90-5	E440	50	mg/kg	37000	38000	2.53%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	120	129	7.05%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	26.6	26.0	1.98%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	608	572	6.13%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.38	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	6.97	7.74	10.4%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	167	156	6.66%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	45.4	13.7	107%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	167000	160000	4.35%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	166	181	8.51%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	46.6	116	85.5%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1820	10200	139%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	77800	71500	8.48%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	351	483	31.5%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	22.0	30.2	31.7%	30%	DUP-H
		Magnesium	7439-95-4	E440	20	mg/kg	12000	11700	2.54%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	920	988	7.16%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	15.9	16.3	2.27%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	127	334	89.7%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	10400	9630	7.67%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5670	5480	3.51%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.76	0.74	0.02	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	8.58	5.00	52.7%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	15700	14800	5.60%	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: 1069994) - continued											
VA23B7595-001	BA2330-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	464	344	29.7%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	11500	11600	1.04%	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	782	149%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	213	294	31.9%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	19.6	28.3	36.6%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	3.52	3.59	2.02%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	42.2	43.1	2.18%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4160	4980	18.0%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.9	2.4	0.5	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: 1069995)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1069993)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1069994)						
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: 1069994) - 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: 1070111)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1070112)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1069992)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1069995)									
Moisture	----	E144	0.25	%	50 %	100.0	90.0	110	----
Metals (QCLot: 1069993)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	----
Metals (QCLot: 1069994)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	101	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	117	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	99.9	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	106	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.7	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	98.3	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.9	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	98.7	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.5	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	91.8	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	98.8	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	113	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.5	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.0	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	111	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	108	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	94.6	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	91.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	108	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	94.6	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1069994) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	109	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	95.7	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	95.3	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	95.7	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	92.4	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	96.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	98.9	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: 1070111)										
VA23B7595-001	BA2330-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.0	50.0	140	----
TCLP Metals (QCLot: 1070112)										
VA23B7595-001	BA2330-A-1	Antimony, TCLP	7440-36-0	E444	6.40 mg/L	5 mg/L	128	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.5 mg/L	5 mg/L	111	50.0	140	----
		Barium, TCLP	7440-39-3	E444	16.4 mg/L	12.5 mg/L	131	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.285 mg/L	0.25 mg/L	114	50.0	140	----
		Boron, TCLP	7440-42-8	E444	12.5 mg/L	10 mg/L	125	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.266 mg/L	0.25 mg/L	106	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.35 mg/L	1.25 mg/L	108	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.51 mg/L	2.5 mg/L	100	50.0	140	----
		Iron, TCLP	7439-89-6	E444	277 mg/L	250 mg/L	111	50.0	140	----
		Lead, TCLP	7439-92-1	E444	12.2 mg/L	10 mg/L	122	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	303 mg/L	250 mg/L	121	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.64 mg/L	2.5 mg/L	106	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.67 mg/L	5 mg/L	113	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.112 mg/L	0.1 mg/L	112	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	6.0 mg/L	5 mg/L	120	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	6.23 mg/L	5 mg/L	124	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.84 mg/L	0.75 mg/L	112	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	85.8	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: 1069993)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Metals (QCLot: 1069994)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	120	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	103	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	113	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	129	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	103	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	120	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	99.1	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	115	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	110	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	120	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	113	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	106	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	105	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	113	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	101	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	114	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	101	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	94.1	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	117	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: 1069994) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	96.9	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	110	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	99.0	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	98.7	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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COC #

Page 1 of 1

Report To				Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)
Company:	Covanta Energy			☐ Standard ☐ Other				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Nicole Victor / Dan Skrypnyk			☑ PDF ☐ Excel ☐ Digital ☐ Fax				○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	5150 Riverbend Drive			Email 1:	nvictor@covanta.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Burnaby BC			Email 2:	ofetherstonhaugh@covanta.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-521-1025	Fax:		Email 3:	dskrypnyk@covanta.com			Analysis Request
		☐ Yes	☐ No		brent.kirkpatrick@metrovancouver.org			
					Sarah.Wellman@metrovancouver.org			
Invoice To	Same as Report ?			Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?	☐ Yes	☐ No		Job #:				
Company:				PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite			
Contact:				LSD:	(includes 2:1 pH)			
Address:								
Phone:		Fax:		Quote #:				
Lab Work Order # (lab use only)	B7595			ALS Contact:		Sampler:		

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
	BA2330-A-1	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-2	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-3	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-4	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-5	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-6	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-7	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-8	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-9	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-10	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-11	26-Jul-23	9:00	Soil	X	X				X							1
	BA2330-A-12	26-Jul-23	9:00	Soil	X	X				X							1

Environmental Division
Vancouver
Work Order Reference
VA23B7595

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
K Chrgis	31/07/23	11:00	CW	July 31	1215	22.2°C				

GENF 20.00 Front