metrovancouver

Bottom Ash Data

2024 Week 3

The following analytical report represents bottom ash composite results for week 3 of 2024 (January 14, 2024 to January 20, 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	: **VA24A1367**	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	: 24-Jan-2024 13:25
PO	: VANCO0000052919	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 08:04
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*
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, 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	BA2403-A-1	BA2403-A-2	BA2403-A-3	BA2403-A-4	BA2403-A-5
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
						VA24A1367-001	VA24A1367-002	VA24A1367-003	VA24A1367-004	VA24A1367-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.2	23.1	24.3	23.7	25.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	12.3	12.3	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		52000	58300	41100	43600	45100
Antimony	7440-36-0	E440/VA	0.10	mg/kg		156	194	126	131	154
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		16.1	15.8	20.3	18.5	20.8
Barium	7440-39-3	E440/VA	0.50	mg/kg		600	595	575	732	735
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.40	0.36	0.38	0.37	0.40
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		11.5	11.0	11.7	11.4	12.0
Boron	7440-42-8	E440/VA	5.0	mg/kg		161	167	157	141	194
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		12.1	8.35	10.3	16.2	11.1
Calcium	7440-70-2	E440/VA	50	mg/kg		150000	152000	140000	142000	159000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		171	150	137	146	234
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		296	128	47.6	224	39.2
Copper	7440-50-8	E440/VA	0.50	mg/kg		3400	19200	3460	1150	1810
Iron	7439-89-6	E440/VA	50	mg/kg		50800	35500	42700	41300	36300
Lead	7439-92-1	E440/VA	0.50	mg/kg		516	513	327	407	573
Lithium	7439-93-2	E440/VA	2.0	mg/kg		24.3	47.1	24.0	26.7	25.4
Magnesium	7439-95-4	E440/VA	20	mg/kg		12900	14200	12500	13400	12300
Manganese	7439-96-5	E440/VA	1.0	mg/kg		805	1410	681	546	724
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0996	0.181	0.0754	0.0598	0.147
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		20.8	20.1	20.6	16.4	21.3
Nickel	7440-02-0	E440/VA	0.50	mg/kg		144	267	386	105	613
Phosphorus	7723-14-0	E440/VA	50	mg/kg		11200	13400	9830	10200	12600
Potassium	7440-09-7	E440/VA	100	mg/kg		6770	6150	7280	6180	9010
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.41	0.44	0.44	0.43	0.46
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.24	12.8	3.99	4.37	7.19
Sodium	7440-23-5	E440/VA	50	mg/kg		18800	17400	19500	19800	21700
Strontium	7440-24-6	E440/VA	0.50	mg/kg		306	328	330	286	336

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2403-A-1	BA2403-A-2	BA2403-A-3	BA2403-A-4	BA2403-A-5
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
						VA24A1367-001	VA24A1367-002	VA24A1367-003	VA24A1367-004	VA24A1367-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		11200	10400	11500	11200	11700
Thallium	7440-28-0	E440/VA	0.050	mg/kg		<0.050	<0.050	0.052	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		170	602	126	197	141
Titanium	7440-32-6	E440/VA	1.0	mg/kg		340	435	446	594	281
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		8.60	8.40	9.09	8.25	7.86
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.69	4.29	4.38	4.18	4.78
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		44.2	51.6	37.9	36.5	41.5
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3400	2980	3540	3550	3940
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.8	4.9	2.9	1.9	4.0
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	12.1	12.1	12.1	12.1
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.31	9.62	9.37	9.40	10.1
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.99	7.91	7.99	8.02	7.98
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		1.84	1.81	1.88	1.93	2.03
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	0.051	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1760	1910	1840	1940	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		0.087	0.184	0.140	0.089	0.231
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.690	0.692	0.764	0.688	0.693
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		115	119	115	112	117
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
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**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2403-A-1	BA2403-A-2	BA2403-A-3	BA2403-A-4	BA2403-A-5
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
						VA24A1367-001	VA24A1367-002	VA24A1367-003	VA24A1367-004	VA24A1367-005
						Result	Result	Result	Result	Result
TCLP Metals										
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
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**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2403-A-6	BA2403-A-7	BA2403-A-8	BA2403-A-9	BA2403-A-10
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
						VA24A1367-006	VA24A1367-007	VA24A1367-008	VA24A1367-009	VA24A1367-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		25.3	24.0	24.1	23.0	24.5
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.3	12.3	12.3	12.3	12.3
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		47600	52700	51200	43700	52300
Antimony	7440-36-0	E440/VA	0.10	mg/kg		137	134	114	154	159
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		16.8	18.4	18.3	16.7	15.0
Barium	7440-39-3	E440/VA	0.50	mg/kg		672	617	655	638	700
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.42	0.39	0.37	0.43	0.38
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		13.0	13.2	10.9	17.4	10.2
Boron	7440-42-8	E440/VA	5.0	mg/kg		160	231	192	126	231
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		11.1	11.5	10.0	14.6	9.62
Calcium	7440-70-2	E440/VA	50	mg/kg		159000	154000	136000	150000	138000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		220	133	138	140	237
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		131	160	241	327	64.3
Copper	7440-50-8	E440/VA	0.50	mg/kg		2240	1050	1000	2620	2970
Iron	7439-89-6	E440/VA	50	mg/kg		41600	45600	45500	40100	52800
Lead	7439-92-1	E440/VA	0.50	mg/kg		390	339	288	411	730
Lithium	7439-93-2	E440/VA	2.0	mg/kg		31.9	41.1	31.4	270	25.7
Magnesium	7439-95-4	E440/VA	20	mg/kg		12600	14100	11800	12100	10600
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1150	800	797	4400	697
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.114	0.114	0.0948	0.0888	0.121
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		19.6	15.8	22.2	16.2	19.1
Nickel	7440-02-0	E440/VA	0.50	mg/kg		240	148	114	883	269
Phosphorus	7723-14-0	E440/VA	50	mg/kg		13300	12700	11200	14300	9810
Potassium	7440-09-7	E440/VA	100	mg/kg		7360	8100	7010	7710	6670
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.46	0.46	0.35	0.49	0.39
Silver	7440-22-4	E440/VA	0.10	mg/kg		4.37	3.97	3.33	4.10	4.93
Sodium	7440-23-5	E440/VA	50	mg/kg		20200	21800	19600	20400	18100
Strontium	7440-24-6	E440/VA	0.50	mg/kg		322	310	287	294	324
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12900	12900	9300	11500	9300

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2403-A-6	BA2403-A-7	BA2403-A-8	BA2403-A-9	BA2403-A-10
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
						VA24A1367-006	VA24A1367-007	VA24A1367-008	VA24A1367-009	VA24A1367-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.052	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg		129	125	110	139	299
Titanium	7440-32-6	E440/VA	1.0	mg/kg		292	402	366	253	609
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		8.30	9.29	6.30	11.1	12.3
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.81	4.02	4.06	4.91	4.14
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		42.1	44.8	38.4	48.1	44.1
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4370	3340	3260	4550	3420
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		2.1	4.3	7.2	3.2	2.8
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.1	12.1	12.1	12.0	12.1
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.63	9.70	9.71	9.49	9.91
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.95	8.00	7.98	7.96	8.00
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		1.92	2.01	2.03	2.10	1.99
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1960	1940	2030	1870	1980
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		0.126	0.107	0.229	0.188	0.095
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.749	0.676	0.651	0.676	0.757
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		122	117	117	124	117
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
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 (Matrix: Soil/Solid)					Client sample ID	BA2403-A-6	BA2403-A-7	BA2403-A-8	BA2403-A-9	BA2403-A-10
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00	17-Jan-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1367-006	VA24A1367-007	VA24A1367-008	VA24A1367-009	VA24A1367-010
						Result	Result	Result	Result	Result
TCLP Metals										
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
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**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA2403-A-11	BA2403-A-12	----	----	----
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	----	----	----
						VA24A1367-011	VA24A1367-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.6	24.3	----	----	----
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		56600	45800	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		158	123	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		14.4	16.0	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		617	722	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.44	0.35	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		11.6	19.6	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		276	192	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		31.0	9.43	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		149000	151000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		104	204	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		26.4	49.1	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		1160	7700	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		24200	44800	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		758	250	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		22.8	22.7	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		11600	10600	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		566	982	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.0958	0.0766	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		14.5	17.6	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		88.2	136	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		11800	14100	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		7810	6320	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.40	0.42	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		7.77	7.44	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		21400	17400	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		297	267	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		10600	10000	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2403-A-11	BA2403-A-12	----	----	----
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1367-011	VA24A1367-012	--------	--------	--------
						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		109	101	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		460	386	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		18.7	9.95	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.72	4.29	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		43.7	45.0	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3190	3140	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.8	3.0	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.1	12.1	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.91	9.64	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.90	2.90	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.97	8.08	----	----	----
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		2.04	1.90	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		1880	1900	----	----	----
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		0.115	0.085	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.614	0.712	----	----	----
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		111	113	----	----	----
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L		<0.25	<0.25	----	----	----
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L		<0.10	<0.10	----	----	----
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L		<0.050	<0.050	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2403-A-11	BA2403-A-12	----	----	----
					Client sampling date / time	17-Jan-2024 09:00	17-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A1367-011	VA24A1367-012	--------	--------	--------
						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		<0.50	<0.50	----	----	----
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.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24A1367**	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	: 24-Jan-2024 13:25
PO	: VANCO0000052919	Issue Date	: 31-Jan-2024 08:04
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

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

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	VA24A1367-001	BA2403-A-1	Chromium	7440-47-3	E440	36.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1367-001	BA2403-A-1	Cobalt	7440-48-4	E440	131 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1367-001	BA2403-A-1	Copper	7440-50-8	E440	42.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1367-001	BA2403-A-1	Tin	7440-31-5	E440	147 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A1367-001	BA2403-A-1	Zinc	7440-66-6	E440	30.6 % 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.*

Reference Material (RM) Sample								
Metals	QC-MRG2-1311790 003	----	Titanium	7440-32-6	E440	132 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

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

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **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 BA2403-A-1	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-10	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-11	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-12	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-2	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-3	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-4	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-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 BA2403-A-5	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-6	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-7	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-8	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2403-A-9	E510	17-Jan-2024	25-Jan-2024	28 days	8 days	✓	26-Jan-2024	28 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-1	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-10	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-11	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-12	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 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 : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-2	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-3	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-4	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-5	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-6	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-7	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-8	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2403-A-9	E440	17-Jan-2024	25-Jan-2024	180 days	8 days	✓	26-Jan-2024	180 days	9 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-1	E144	17-Jan-2024	----	----	----		25-Jan-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 BA2403-A-10	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-11	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-12	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-2	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-3	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-4	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-5	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-6	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-7	E144	17-Jan-2024	----	----	----		25-Jan-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 BA2403-A-8	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2403-A-9	E144	17-Jan-2024	----	----	----		25-Jan-2024	----	8 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-1	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-10	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-11	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-12	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-2	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-3	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-4	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-5	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-6	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-7	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-8	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2403-A-9	E108	17-Jan-2024	25-Jan-2024	30 days	8 days	✓	25-Jan-2024	30 days	8 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-1	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-10	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-11	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-12	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 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) BA2403-A-2	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-3	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-4	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-5	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-6	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-7	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-8	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2403-A-9	E512	25-Jan-2024	31-Jan-2024	37 days	14 days	✓	31-Jan-2024	37 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-1	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 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) BA2403-A-10	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-11	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-12	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-2	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-3	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-4	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-5	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-6	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-7	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 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) BA2403-A-8	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2403-A-9	E444	25-Jan-2024	31-Jan-2024	189 days	14 days	✓	31-Jan-2024	189 days	14 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-1	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-10	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-11	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-12	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-2	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-3	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-4	EPP444	17-Jan-2024	25-Jan-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*		*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) BA2403-A-5	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-6	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-7	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-8	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2403-A-9	EPP444	17-Jan-2024	25-Jan-2024	----	----		----	28 days	9 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	1311790	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1311791	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1311795	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1311792	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1311790	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1311791	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	1311795	1	16	6.2	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1311792	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1317973	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1311790	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1317974	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1311791	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1311795	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1317973	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1317974	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	: **VA24A1367**	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	: 24-Jan-2024 13:25
PO	: VANCO0000052919	Date Analysis Commenced	: 25-Jan-2024
C-O-C number	: ----	Issue Date	: 31-Jan-2024 08:04
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*
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Vancouver Organics, 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: 1311792)											
VA24A1367-001	BA2403-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.3	12.3	0.2%	5%	----
Physical Tests (QC Lot: 1311795)											
VA24A1367-001	BA2403-A-1	Moisture	----	E144	0.25	%	24.2	25.1	3.60%	20%	----
Metals (QC Lot: 1311790)											
VA24A1367-001	BA2403-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0996	0.0564	0.0432	Diff <2x LOR	----
Metals (QC Lot: 1311791)											
VA24A1367-001	BA2403-A-1	Aluminum	7429-90-5	E440	50	mg/kg	52000	39900	26.4%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	156	132	16.8%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	16.1	15.6	3.03%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	600	631	5.03%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.45	0.05	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	11.5	11.2	2.92%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	161	215	28.8%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	12.1	9.69	22.5%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	150000	155000	3.09%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	171	118	36.6%	30%	DUP-H
		Cobalt	7440-48-4	E440	0.10	mg/kg	296	61.6	131%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	3400	2220	42.0%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	50800	41500	20.3%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	516	353	37.4%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	24.3	27.5	12.6%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12900	12300	4.54%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	805	712	12.3%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	20.8	21.3	2.27%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	144	123	15.5%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	11200	9330	18.5%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	6770	6500	4.08%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.43	0.02	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	4.24	3.88	8.75%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	18800	19700	4.46%	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: 1311791) - continued											
VA24A1367-001	BA2403-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	306	327	6.62%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	11200	10600	5.00%	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	170	1110	147%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	340	363	6.32%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	8.60	9.31	7.91%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.69	4.55	2.91%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	44.2	39.3	11.9%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3400	4630	30.6%	30%	DUP-H
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.8	2.4	0.4	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: 1311795)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1311790)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1311791)						
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: 1311791) - 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: 1317973)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1317974)						
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: 1311792)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1311795)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1311790)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	99.6	80.0	120	----
Metals (QCLot: 1311791)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	111	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	97.3	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	91.6	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.5	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	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	104	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	96.5	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	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	107	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	95.1	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	111	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	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: 1311791) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	108	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	111	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	115	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	106	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	109	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: 1317973)										
VA24A1367-001	BA2403-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.9	50.0	140	----
TCLP Metals (QCLot: 1317974)										
VA24A1367-001	BA2403-A-1	Antimony, TCLP	7440-36-0	E444	3.92 mg/L	5 mg/L	78.5	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.3 mg/L	5 mg/L	85.2	50.0	140	----
		Barium, TCLP	7440-39-3	E444	9.5 mg/L	12.5 mg/L	75.8	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.191 mg/L	0.25 mg/L	76.4	50.0	140	----
		Boron, TCLP	7440-42-8	E444	7.44 mg/L	10 mg/L	74.4	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.204 mg/L	0.25 mg/L	81.5	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	1.04 mg/L	1.25 mg/L	83.0	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	0.208 mg/L	0.25 mg/L	83.1	50.0	140	----
		Copper, TCLP	7440-50-8	E444	1.94 mg/L	2.5 mg/L	77.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	191 mg/L	250 mg/L	76.4	50.0	140	----
		Lead, TCLP	7439-92-1	E444	6.78 mg/L	10 mg/L	67.8	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	218 mg/L	250 mg/L	87.3	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	1.99 mg/L	2.5 mg/L	79.6	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	3.99 mg/L	5 mg/L	79.8	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.073 mg/L	0.1 mg/L	73.1	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	3.5 mg/L	5 mg/L	69.8	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	3.61 mg/L	5 mg/L	72.2	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.62 mg/L	0.75 mg/L	83.2	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	7.99 mg/L	10 mg/L	79.9	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.7 mg/L	1 mg/L	74.5	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: 1311790)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	96.2	70.0	130	----
Metals (QCLot: 1311791)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	119	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	106	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	117	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	114	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	115	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	128	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	105	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	120	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	110	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	109	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	108	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	114	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	114	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	113	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	110	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	114	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	124	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	115	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	111	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	116	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	106	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	# 132	70.0	130	MES

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Reference Material (RM) Report: Recovery (%) RM	Reference Material (RM) Report: Recovery Limits (%) Low	Reference Material (RM) Report: Recovery Limits (%) High	Qualifier
Metals (QCLot: 1311791) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	126	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	116	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	108	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	118	70.0	130	----

Qualifiers

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

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

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)	A1367			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
	BA2403-A-1	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-2	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-3	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-4	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-5	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-6	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-7	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-8	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-9	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-10	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-11	17-Jan-24	9:00	Soil	X	X		X	1
	BA2403-A-12	17-Jan-24	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA24A1367

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
	24-Jan-24	0800				17 °C	SP	24/1/24	1:25PM	

GENF 20.00 Front