Bottom Ash Data

2024 Week 2

The following analytical report represents bottom ash composite results for week 2 of 2024 (January 7, 2024 to January 13, 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	: **VA24A0842**	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	: 16-Jan-2024 15:15
PO	: VANCO0000052919	Date Analysis Commenced	: 18-Jan-2024
C-O-C number	: ----	Issue Date	: 22-Jan-2024 14:54
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*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analsyt	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	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	BA 2402-A-1	BA 2402-A-2	BA 2402-A-3	BA 2402-A-4	BA 2402-A-5
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
						VA24A0842-001	VA24A0842-002	VA24A0842-003	VA24A0842-004	VA24A0842-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		23.4	23.8	22.6	24.0	23.7
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.0	12.0	11.9	12.0	11.8
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		39200	33700	41000	38000	38200
Antimony	7440-36-0	E440/VA	0.10	mg/kg		171	170	191	146	143
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		18.0	18.9	20.6	17.3	24.2
Barium	7440-39-3	E440/VA	0.50	mg/kg		450	426	499	503	461
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.38	0.42	0.45	0.53	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		24.7	22.8	21.5	27.4	20.6
Boron	7440-42-8	E440/VA	5.0	mg/kg		155	209	194	221	205
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		17.6	18.6	36.1	17.1	15.6
Calcium	7440-70-2	E440/VA	50	mg/kg		151000	153000	167000	157000	152000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		157	302	168	173	140
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		30.3	66.8	345	108	46.9
Copper	7440-50-8	E440/VA	0.50	mg/kg		1460	1210	1980	1420	1650
Iron	7439-89-6	E440/VA	50	mg/kg		39400	34600	41500	38900	39600
Lead	7439-92-1	E440/VA	0.50	mg/kg		383	379	405	393	420
Lithium	7439-93-2	E440/VA	2.0	mg/kg		21.9	23.8	43.0	26.6	38.4
Magnesium	7439-95-4	E440/VA	20	mg/kg		12400	12300	12700	11500	11200
Manganese	7439-96-5	E440/VA	1.0	mg/kg		966	607	876	752	813
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.275	0.158	0.197	0.161	0.142
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		26.7	39.1	23.1	19.8	19.5
Nickel	7440-02-0	E440/VA	0.50	mg/kg		118	355	159	139	195
Phosphorus	7723-14-0	E440/VA	50	mg/kg		11000	10700	13000	10000	11400
Potassium	7440-09-7	E440/VA	100	mg/kg		6710	8180	8450	8140	7290
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.58	0.48	0.55	0.47	0.51
Silver	7440-22-4	E440/VA	0.10	mg/kg		9.39	6.62	7.52	5.11	9.54
Sodium	7440-23-5	E440/VA	50	mg/kg		16600	19600	18900	18500	17300
Strontium	7440-24-6	E440/VA	0.50	mg/kg		322	326	308	309	295

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA 2402-A-1	BA 2402-A-2	BA 2402-A-3	BA 2402-A-4	BA 2402-A-5
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
						VA24A0842-001	VA24A0842-002	VA24A0842-003	VA24A0842-004	VA24A0842-005
						Result	Result	Result	Result	Result
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg		13100	12600	12700	12000	12700
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.055	0.056	0.054	0.051	0.076
Tin	7440-31-5	E440/VA	2.0	mg/kg		140	152	173	145	224
Titanium	7440-32-6	E440/VA	1.0	mg/kg		218	192	199	193	196
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		8.85	20.4	11.0	7.40	6.70
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.59	4.99	4.87	4.33	4.73
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		40.0	42.0	43.1	41.1	39.8
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4080	3890	5130	4210	6400
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		3.4	3.1	2.8	5.4	3.2
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	11.9	12.0	11.9	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.86	8.82	8.93	8.77	8.73
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.87	2.87	2.87	2.87	2.87
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.94	7.97	7.92	8.04	8.02
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		2.00	1.95	2.06	2.05	2.05
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		2150	2190	2200	2210	2210
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		0.269	0.309	0.154	0.086	0.195
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.721	0.701	0.695	0.790	0.696
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		129	127	133	129	127
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)					Client sample ID	BA 2402-A-1	BA 2402-A-2	BA 2402-A-3	BA 2402-A-4	BA 2402-A-5
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A0842-001	VA24A0842-002	VA24A0842-003	VA24A0842-004	VA24A0842-005
						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	BA 2402-A-6	BA 2402-A-7	BA 2402-A-8	BA 2402-A-9	BA 2402-A-10
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
						VA24A0842-006	VA24A0842-007	VA24A0842-008	VA24A0842-009	VA24A0842-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		21.0	24.9	24.5	24.0	23.9
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		12.0	11.9	12.1	11.9	12.0
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		33500	40500	31200	43300	38200
Antimony	7440-36-0	E440/VA	0.10	mg/kg		180	200	188	177	190
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		29.8	20.9	23.4	21.0	20.2
Barium	7440-39-3	E440/VA	0.50	mg/kg		529	496	521	522	453
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		0.39	0.41	0.41	0.44	0.41
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		33.5	35.0	21.9	29.2	21.9
Boron	7440-42-8	E440/VA	5.0	mg/kg		172	174	167	201	192
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		19.1	18.9	20.0	42.2	17.6
Calcium	7440-70-2	E440/VA	50	mg/kg		170000	163000	160000	167000	168000
Chromium	7440-47-3	E440/VA	0.50	mg/kg		214	184	608	132	202
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		203	59.4	33.7	130	84.8
Copper	7440-50-8	E440/VA	0.50	mg/kg		1370	1530	1710	3080	2640
Iron	7439-89-6	E440/VA	50	mg/kg		47600	54200	52100	39400	48400
Lead	7439-92-1	E440/VA	0.50	mg/kg		1580	414	425	415	379
Lithium	7439-93-2	E440/VA	2.0	mg/kg		30.3	24.9	24.0	30.4	30.2
Magnesium	7439-95-4	E440/VA	20	mg/kg		12600	12500	12100	12000	12600
Manganese	7439-96-5	E440/VA	1.0	mg/kg		1090	783	793	779	701
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.165	0.234	0.164	0.151	0.151
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		21.3	23.4	95.1	23.0	38.5
Nickel	7440-02-0	E440/VA	0.50	mg/kg		233	408	531	101	183
Phosphorus	7723-14-0	E440/VA	50	mg/kg		13000	11000	11300	14100	11500
Potassium	7440-09-7	E440/VA	100	mg/kg		8290	7940	8030	7710	7520
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.68	0.65	0.64	0.60	0.57
Silver	7440-22-4	E440/VA	0.10	mg/kg		23.1	6.06	8.04	6.54	7.08
Sodium	7440-23-5	E440/VA	50	mg/kg		18400	18100	18300	18900	17600
Strontium	7440-24-6	E440/VA	0.50	mg/kg		349	311	333	407	307
Sulfur	7704-34-9	E440/VA	1000	mg/kg		14200	14900	14800	14600	14900

Analytical Results

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

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA 2402-A-6	BA 2402-A-7	BA 2402-A-8	BA 2402-A-9	BA 2402-A-10
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
						VA24A0842-006	VA24A0842-007	VA24A0842-008	VA24A0842-009	VA24A0842-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.056	0.056	0.057	<0.050	0.052
Tin	7440-31-5	E440/VA	2.0	mg/kg		177	193	325	188	159
Titanium	7440-32-6	E440/VA	1.0	mg/kg		172	234	253	208	222
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		10.2	8.49	12.1	7.69	13.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.65	5.22	4.34	4.45	4.80
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		46.9	45.6	45.7	43.1	44.0
Zinc	7440-66-6	E440/VA	2.0	mg/kg		4270	4490	4060	4520	4550
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		1.9	1.5	2.3	3.8	2.1
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		11.9	12.0	12.0	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		8.86	9.06	9.01	8.93	8.92
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.87	2.87	2.87	2.87	2.87
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.93	7.91	8.03	7.97	7.77
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	2.09	2.02	2.17	2.12
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		2180	2170	2160	2220	2240
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		0.178	0.137	0.117	0.242	0.190
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.724	0.713	0.786	0.657	0.865
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		131	135	127	130	133
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**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	BA 2402-A-6	BA 2402-A-7	BA 2402-A-8	BA 2402-A-9	BA 2402-A-10
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00	10-Jan-2024 09:00
						VA24A0842-006	VA24A0842-007	VA24A0842-008	VA24A0842-009	VA24A0842-010
						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	BA 2402-A-11	BA 2402-A-12	----	----	----
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	----	----	----
						VA24A0842-011	VA24A0842-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		23.9	22.2	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		11.9	12.0	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg		43900	35300	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg		166	185	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg		17.8	21.2	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg		451	435	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg		2.56	0.42	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg		76.0	22.8	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg		140	158	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg		16.3	18.6	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg		147000	161000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg		138	160	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg		252	48.9	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg		3400	1880	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg		43000	49600	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg		384	531	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg		31.3	22.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg		11100	12300	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg		969	698	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg		0.136	0.134	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg		22.1	66.4	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg		539	139	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg		10100	9730	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg		6730	6540	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg		0.57	0.58	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg		5.15	5.81	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg		17300	15900	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg		288	310	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg		12400	13800	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA 2402-A-11	BA 2402-A-12	----	----	----
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A0842-011	VA24A0842-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg		0.050	0.064	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg		168	218	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg		262	222	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg		9.79	10.8	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg		4.02	4.55	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg		38.1	41.4	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg		3800	8300	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg		4.1	2.7	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units		12.0	11.9	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units		9.07	8.80	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units		2.87	2.87	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units		7.85	7.66	----	----	----
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		2.16	2.11	----	----	----
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L		0.065	<0.050	----	----	----
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L		2280	2260	----	----	----
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		1.59	0.221	----	----	----
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L		0.783	0.682	----	----	----
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		131	130	----	----	----
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	BA 2402-A-11	BA 2402-A-12	----	----	----
					Client sampling date / time	10-Jan-2024 09:00	10-Jan-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24A0842-011	VA24A0842-012	--------	--------	--------
						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		0.80	<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.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24A0842**	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	: 16-Jan-2024 15:15
PO	: VANCO0000052919	Issue Date	: 22-Jan-2024 14:53
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	VA24A0842-001	BA 2402-A-1	Cadmium	7440-43-9	E440	33.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A0842-001	BA 2402-A-1	Cobalt	7440-48-4	E440	113 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A0842-001	BA 2402-A-1	Iron	7439-89-6	E440	32.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A0842-001	BA 2402-A-1	Mercury	7439-97-6	E510	0.116 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

Result Qualifiers

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-1	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-10	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-11	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-12	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-2	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-3	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-4	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 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 BA 2402-A-5	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-6	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-7	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-8	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA 2402-A-9	E510	10-Jan-2024	20-Jan-2024	28 days	10 days	✓	21-Jan-2024	28 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-1	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-10	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-11	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-12	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 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 BA 2402-A-2	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-3	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-4	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-5	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-6	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-7	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-8	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA 2402-A-9	E440	10-Jan-2024	20-Jan-2024	180 days	10 days	✓	21-Jan-2024	180 days	11 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-1	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	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*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-10	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-11	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-12	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-2	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-3	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-4	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-5	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-6	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-7	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	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*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-8	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA 2402-A-9	E144	10-Jan-2024	----	----	----		19-Jan-2024	----	9 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-1	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-10	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-11	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-12	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-2	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-3	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-4	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-5	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-6	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-7	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-8	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA 2402-A-9	E108	10-Jan-2024	20-Jan-2024	30 days	10 days	✓	20-Jan-2024	30 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-1	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-10	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-11	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-12	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-2	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-3	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-4	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-5	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-6	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-7	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-8	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA 2402-A-9	E512	18-Jan-2024	20-Jan-2024	36 days	10 days	✓	20-Jan-2024	36 days	10 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-1	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 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) BA 2402-A-10	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-11	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-12	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-2	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-3	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-4	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-5	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-6	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-7	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 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) BA 2402-A-8	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA 2402-A-9	E444	18-Jan-2024	20-Jan-2024	188 days	10 days	✓	21-Jan-2024	188 days	11 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-1	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-10	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-11	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-12	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-2	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-3	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-4	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓

Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*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) BA 2402-A-5	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-6	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-7	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-8	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA 2402-A-9	EPP444	10-Jan-2024	18-Jan-2024	----	----		----	28 days	8 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1306426	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1306427	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1306429	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1306428	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1306426	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1306427	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	1306429	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1306428	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1307656	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1306426	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1307657	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1306427	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1306429	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1307656	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	1307657	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	: **VA24A0842**	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	: 16-Jan-2024 15:15
PO	: VANCO0000052919	Date Analysis Commenced	: 18-Jan-2024
C-O-C number	: ----	Issue Date	: 22-Jan-2024 14:53
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*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analsyt	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	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: 1306428)											
VA24A0842-001	BA 2402-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.0	11.7	2.1%	5%	----
Physical Tests (QC Lot: 1306429)											
VA24A0842-001	BA 2402-A-1	Moisture	----	E144	0.25	%	23.4	22.4	4.33%	20%	----
Metals (QC Lot: 1306426)											
VA24A0842-001	BA 2402-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.275	# 0.159	0.116	Diff <2x LOR	DUP-H,J
Metals (QC Lot: 1306427)											
VA24A0842-001	BA 2402-A-1	Aluminum	7429-90-5	E440	50	mg/kg	39200	31800	21.0%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	171	185	7.92%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	18.0	17.5	3.12%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	450	446	0.676%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.38	0.005	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	24.7	20.4	18.9%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	155	147	5.21%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	17.6	24.6	33.0%	30%	DUP-H
		Calcium	7440-70-2	E440	50	mg/kg	151000	143000	5.50%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	157	125	22.4%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	30.3	109	113%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1460	1320	10.1%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	39400	54500	32.2%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	383	483	23.1%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	21.9	27.7	23.5%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	12400	11300	9.46%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	966	732	27.5%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	26.7	22.5	17.2%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	118	144	20.1%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	11000	9300	16.8%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	6710	7420	10.0%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.58	0.55	0.03	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	9.39	7.55	21.6%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	16600	17000	2.62%	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: 1306427) - continued											
VA24A0842-001	BA 2402-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	322	288	11.1%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13100	12800	2.21%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.055	0.066	0.011	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	140	132	5.77%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	218	232	6.23%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	8.85	10.4	15.9%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	4.59	4.25	7.54%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	40.0	38.0	5.14%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	4080	3900	4.62%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	3.4	3.1	0.4	Diff <2x LOR	----

Qualifiers

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

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1306429)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1306426)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1306427)						
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: 1306427) - 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: 1307656)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1307657)						
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: 1306428)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 1306429)									
Moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 1306426)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Metals (QCLot: 1306427)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	107	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	107	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	103	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	104	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	103	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	112	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	106	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	98.0	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.2	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	113	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: 1306427) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	100	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	96.6	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	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	106	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: 1307656)										
VA24A0842-001	BA 2402-A-1	Mercury, TCLP	7439-97-6	E512	0.0007 mg/L	0.001 mg/L	73.6	50.0	140	----
TCLP Metals (QCLot: 1307657)										
VA24A0842-001	BA 2402-A-1	Antimony, TCLP	7440-36-0	E444	5.13 mg/L	5 mg/L	103	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.9 mg/L	12.5 mg/L	95.4	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.264 mg/L	0.25 mg/L	106	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.85 mg/L	10 mg/L	98.5	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.242 mg/L	0.25 mg/L	96.6	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	1.27 mg/L	1.25 mg/L	101	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	2.36 mg/L	2.5 mg/L	94.4	50.0	140	----
		Iron, TCLP	7439-89-6	E444	236 mg/L	250 mg/L	94.5	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.61 mg/L	10 mg/L	96.1	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	262 mg/L	250 mg/L	105	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.46 mg/L	2.5 mg/L	98.6	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.82 mg/L	5 mg/L	96.4	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.088 mg/L	0.1 mg/L	88.4	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	98.4	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.79 mg/L	5 mg/L	95.8	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.75 mg/L	0.75 mg/L	100	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	10.0 mg/L	10 mg/L	100	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	1.0 mg/L	1 mg/L	98.3	50.0	150	----

Reference Material (RM) Report

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

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1306426)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	111	70.0	130	----
Metals (QCLot: 1306427)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	114	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	98.1	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	111	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	109	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	126	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	104	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	104	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	122	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	108	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	107	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	104	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	117	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	103	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	91.1	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	118	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	112	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	106	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	105	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	127	70.0	130	----

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: 1306427) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	106	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	109	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	108	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

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:	rminchin@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# _VANCO 00000_____Weekly Bottom Ash -			
Contact:				LSD:	(includes 2:1 pH)			
Address:								
Phone:		Fax:		Quote #:				
Lab Work Order # (lab use only)	A0842			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
	BA 2402-A-1	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-2	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-3	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-4	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-5	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-6	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-7	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-8	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-9	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-10	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-11	10-Jan-24	9:00	Soil	X	X				X						1
	BA 2402-A-12	10-Jan-24	9:00	Soil	X	X				X						1

Environmental Division
Vancouver
Work Order Reference
VA24A0842

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
KINGLIS	Jan 16/2024	9:00	JC	JAN 16 2024	15:15	10 °C				