

Bottom Ash Data

2024 Week 19

The following analytical report represents bottom ash composite results for week 19 of 2024 (May 5, 2024 to May 18, 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 : **VA24B0794**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
Telephone : ----
Project : Weekly Bottom Ash - Suite
PO : VANCO0000052919
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Covanta Burnaby Standing Offer 2024
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : ALS Environmental - Vancouver
Account Manager : Ian Chen
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 14-May-2024 13:40
Date Analysis Commenced : 15-May-2024
Issue Date : 21-May-2024 17:03

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia



General Comments

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

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

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

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

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2419-A-1	BA2419-A-2	BA2419-A-3	BA2419-A-4	BA2419-A-5
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-001	VA24B0794-002	VA24B0794-003	VA24B0794-004	VA24B0794-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	18.1	19.7	21.0	20.7	20.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.1	12.1	12.0	12.2	12.0
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	40300	32700	35200	43900	39700
Antimony	7440-36-0	E440/VA	0.10	mg/kg	102	118	130	116	97.8
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.8	27.3	25.7	21.8	18.8
Barium	7440-39-3	E440/VA	0.50	mg/kg	585	522	581	426	468
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.37	0.39	0.40	0.37	0.35
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.53	10.5	10.3	7.26	6.82
Boron	7440-42-8	E440/VA	5.0	mg/kg	218	235	232	183	170
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.5	10.8	11.7	11.0	8.74
Calcium	7440-70-2	E440/VA	50	mg/kg	153000	162000	176000	143000	140000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	216	159	168	158	199
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	59.0	86.4	46.6	56.5	203
Copper	7440-50-8	E440/VA	0.50	mg/kg	1230	1860	3310	2150	2260
Iron	7439-89-6	E440/VA	50	mg/kg	37800	46200	50000	39900	41500
Lead	7439-92-1	E440/VA	0.50	mg/kg	459	390	541	369	315
Lithium	7439-93-2	E440/VA	2.0	mg/kg	28.8	36.4	31.3	28.6	36.9
Magnesium	7439-95-4	E440/VA	20	mg/kg	13700	12400	13900	11600	11100
Manganese	7439-96-5	E440/VA	1.0	mg/kg	803	780	892	738	803
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0698	0.114	0.146	0.0933	0.112
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	37.4	33.4	37.8	30.8	30.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg	154	183	406	146	337
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9170	9120	10200	8900	7220
Potassium	7440-09-7	E440/VA	100	mg/kg	5980	5820	6820	5510	5230
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.30	0.37	0.44	0.35	0.33
Silver	7440-22-4	E440/VA	0.10	mg/kg	7.80	5.76	8.93	5.07	5.35
Sodium	7440-23-5	E440/VA	50	mg/kg	18200	16100	19200	15200	15200
Strontium	7440-24-6	E440/VA	0.50	mg/kg	318	319	368	279	270



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2419-A-1	BA2419-A-2	BA2419-A-3	BA2419-A-4	BA2419-A-5
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-001	VA24B0794-002	VA24B0794-003	VA24B0794-004	VA24B0794-005
					Result	Result	Result	Result	Result
Metals									
Sulfur	7704-34-9	E440/VA	1000	mg/kg	12400	13000	14500	11600	11300
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	81.9	171	116	93.9	74.4
Titanium	7440-32-6	E440/VA	1.0	mg/kg	328	389	337	382	433
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	13.0	17.8	23.6	12.3	13.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.06	3.47	3.75	3.26	2.94
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	43.8	58.2	48.3	41.7	38.7
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3380	3830	5440	3540	3360
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.4	1.7	2.2	3.7	2.4
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.8	11.9	11.9	11.8
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.71	6.82	6.93	6.81	6.77
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.61	6.59	7.27	6.56	6.67
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	2.04	1.79	2.04	3.13
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.149	0.115	<0.050	0.121	0.095
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2330	2320	2060	2370	2390
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	0.856	0.800	0.440	0.644	1.04
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.652	1.27	0.796	1.02	1.05
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	110	113	95.4	118	110
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	0.35	0.29	<0.25	0.33	0.32
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2419-A-1	BA2419-A-2	BA2419-A-3	BA2419-A-4	BA2419-A-5
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-001	VA24B0794-002	VA24B0794-003	VA24B0794-004	VA24B0794-005
					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	15.2	20.7	0.56	26.2	10.9
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10

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

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



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2419-A-6	BA2419-A-7	BA2419-A-8	BA2419-A-9	BA2419-A-10
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-006	VA24B0794-007	VA24B0794-008	VA24B0794-009	VA24B0794-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	20.5	20.7	20.4	19.1	21.2
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.2	12.1	12.0	12.1	12.2
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	47400	33200	31300	39300	42800
Antimony	7440-36-0	E440/VA	0.10	mg/kg	93.6	71.0	126	89.6	102
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	16.5	17.1	26.1	18.0	22.9
Barium	7440-39-3	E440/VA	0.50	mg/kg	577	658	464	635	678
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.38	0.34	0.37	0.34	0.36
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.16	5.18	11.1	7.67	20.6
Boron	7440-42-8	E440/VA	5.0	mg/kg	198	247	213	183	213
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	7.17	8.17	16.2	7.77	7.32
Calcium	7440-70-2	E440/VA	50	mg/kg	136000	125000	167000	138000	147000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	213	233	154	109	137
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	54.7	25.5	140	121	87.8
Copper	7440-50-8	E440/VA	0.50	mg/kg	1220	1260	2980	1930	1680
Iron	7439-89-6	E440/VA	50	mg/kg	35600	55800	41800	54600	42400
Lead	7439-92-1	E440/VA	0.50	mg/kg	260	322	510	297	334
Lithium	7439-93-2	E440/VA	2.0	mg/kg	28.0	21.5	50.0	24.6	25.6
Magnesium	7439-95-4	E440/VA	20	mg/kg	11000	9880	13000	10500	11600
Manganese	7439-96-5	E440/VA	1.0	mg/kg	815	904	785	671	675
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0696	0.0642	0.195	0.0881	0.0642
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	26.4	23.3	36.8	180	27.8
Nickel	7440-02-0	E440/VA	0.50	mg/kg	132	112	158	160	332
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7930	8210	9330	10700	9490
Potassium	7440-09-7	E440/VA	100	mg/kg	5520	4280	6210	5150	5310
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.26	0.26	0.49	0.35	0.31
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.39	4.92	5.67	3.54	15.7
Sodium	7440-23-5	E440/VA	50	mg/kg	15800	13200	17000	14500	15600
Strontium	7440-24-6	E440/VA	0.50	mg/kg	271	320	358	265	277
Sulfur	7704-34-9	E440/VA	1000	mg/kg	10100	8200	13500	9500	10000



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2419-A-6	BA2419-A-7	BA2419-A-8	BA2419-A-9	BA2419-A-10
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-006	VA24B0794-007	VA24B0794-008	VA24B0794-009	VA24B0794-010
					Result	Result	Result	Result	Result
Metals									
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	0.051	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	83.0	79.8	185	91.2	86.9
Titanium	7440-32-6	E440/VA	1.0	mg/kg	314	229	268	272	343
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	11.8	9.91	15.4	11.9	13.4
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.64	2.31	3.61	2.63	2.88
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	40.4	44.6	45.3	34.6	53.1
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2570	3420	6390	3250	3710
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.5	2.3	2.2	3.1	2.6
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.9	11.9	11.8	11.9	11.9
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	8.03	6.44	6.89	6.77	6.68
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.84	2.84	2.84	2.84	2.84
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.75	6.93	6.84	7.07	7.03
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	2.02	1.94	1.97	2.02	2.04
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.075	0.070	0.088	0.062	0.098
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2190	2160	2180	2240	2220
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	0.394	0.442	0.733	0.675	0.652
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.936	0.816	0.957	0.949	0.794
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	0.27	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	101	99.1	105	102	100
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	0.26	<0.25	<0.25
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2419-A-6	BA2419-A-7	BA2419-A-8	BA2419-A-9	BA2419-A-10
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00	08-May-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-006	VA24B0794-007	VA24B0794-008	VA24B0794-009	VA24B0794-010
					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	8.41	8.58	7.23	2.80	2.41
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10

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

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



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2419-A-11	BA2419-A-12	----	----	----
					08-May-2024 09:00	08-May-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-011	VA24B0794-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	21.2	20.5	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.1	11.9	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	53500	28800	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	104	97.0	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	22.2	20.3	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	688	437	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.44	0.29	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.21	23.4	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	235	161	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.5	8.30	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	145000	131000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	165	163	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	38.5	91.3	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	11200	2000	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	45700	56700	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	280	668	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	24.3	21.3	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	12200	11000	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	783	713	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0642	0.0755	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	33.6	35.8	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	175	133	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	8900	7210	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	6000	4570	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.34	0.29	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	6.15	6.33	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	18000	13500	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	384	254	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	10800	10400	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2419-A-11	BA2419-A-12	----	----	----
Client sampling date / time					08-May-2024 09:00	08-May-2024 09:00	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-011	VA24B0794-012	-----	-----	-----
					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	115	146	---	---	---
Titanium	7440-32-6	E440/VA	1.0	mg/kg	1000	284	---	---	---
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	17.0	13.6	---	---	---
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.98	2.81	---	---	---
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	44.4	36.8	---	---	---
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3770	3700	---	---	---
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.8	2.1	---	---	---
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.9	11.8	---	---	---
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.51	6.32	---	---	---
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.84	2.84	---	---	---
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.77	6.63	---	---	---
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	2.12	2.10	---	---	---
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.088	0.096	---	---	---
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2360	2360	---	---	---
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	0.681	0.871	---	---	---
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.08	1.09	---	---	---
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	113	107	---	---	---
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	0.27	0.32	---	---	---
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	---	---	---
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	---	---	---



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID		BA2419-A-11	BA2419-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		08-May-2024 09:00	08-May-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24B0794-011	VA24B0794-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	---	---	---	---	---
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	13.2	13.2	---	---	---	---	---
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.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA24B0794</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO0000052919</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Covanta Burnaby Standing Offer 2024</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 16</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 14-May-2024 13:40</p> <p>Issue Date : 21-May-2024 17:03</p>
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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	VA24B0794-001	BA2419-A-1	Bismuth	7440-69-9	E440	39.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B0794-001	BA2419-A-1	Cobalt	7440-48-4	E440	80.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B0794-001	BA2419-A-1	Nickel	7440-02-0	E440	48.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24B0794-001	BA2419-A-1	Silver	7440-22-4	E440	76.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-1	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-10	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-11	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-12	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-2	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-3	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2419-A-4	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2419-A-5	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2419-A-6	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2419-A-7	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2419-A-8	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2419-A-9	E510	08-May-2024	19-May-2024	28 days	11 days	✔	21-May-2024	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-1	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-10	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-11	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-12	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-2	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-3	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-4	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-5	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-6	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-7	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-8	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2419-A-9	E440	08-May-2024	19-May-2024	180 days	11 days	✔	21-May-2024	180 days	13 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2419-A-1	E144	08-May-2024	----	----	----		17-May-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 BA2419-A-10	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-11	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-12	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-2	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-3	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-4	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-5	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-6	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-7	E144	08-May-2024	----	----	----		17-May-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 BA2419-A-8	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2419-A-9	E144	08-May-2024	----	----	----		17-May-2024	----	9 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-1	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-10	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-11	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-12	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-2	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-3	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-4	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-5	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-6	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-7	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-8	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2419-A-9	E108	08-May-2024	19-May-2024	30 days	11 days	✔	19-May-2024	30 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-1	E512	15-May-2024	17-May-2024	36 days	9 days	✔	17-May-2024	36 days	9 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-10	E512	15-May-2024	17-May-2024	36 days	9 days	✔	17-May-2024	36 days	9 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-11	E512	15-May-2024	17-May-2024	36 days	9 days	✔	17-May-2024	36 days	9 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-12	E512	15-May-2024	17-May-2024	36 days	9 days	✔	17-May-2024	36 days	9 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-2	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-3	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-4	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-5	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-6	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-7	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-8	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2419-A-9	E512	15-May-2024	17-May-2024	36 days	9 days	✓	17-May-2024	36 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-1	E444	15-May-2024	17-May-2024	188 days	9 days	✓	17-May-2024	188 days	9 days	✓



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-10	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-11	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-12	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-2	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-3	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-4	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-5	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-6	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2419-A-7	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔



Matrix: Soil/Solid

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2419-A-8	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2419-A-9	E444	15-May-2024	17-May-2024	188 days	9 days	✔	17-May-2024	188 days	9 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-1	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-10	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-11	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-12	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-2	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-3	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-4	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔	



Matrix: **Soil/Solid**

Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-5	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-6	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-7	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-8	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2419-A-9	EPP444	08-May-2024	15-May-2024	----	----		----	28 days	8 days	✔

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury by CVAAS (TCLP)	E512	1447248	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1449189	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1447247	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1449190	1	14	7.1	5.0	✔
Moisture Content by Gravimetry	E144	1449192	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1449191	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1449189	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1449190	2	14	14.2	10.0	✔
Moisture Content by Gravimetry	E144	1449192	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1449191	1	13	7.6	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1447248	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1449189	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1447247	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1449190	1	14	7.1	5.0	✔
Moisture Content by Gravimetry	E144	1449192	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1447248	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1447247	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 $20 \pm 5^{\circ}\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^{\circ}\text{C}$) 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 HNO_3 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 HNO_3 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 $<60^{\circ}\text{C}$) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.

Page : 16 of 16
 Work Order : VA24B0794
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 HNO ₃ 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	: VA24B0794	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	: 14-May-2024 13:40
PO	: VANCO0000052919	Date Analysis Commenced	: 15-May-2024
C-O-C number	: ----	Issue Date	: 21-May-2024 17:03
Sampler	: ----		
Site	: ----		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

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



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1449191)											
VA24B0794-001	BA2419-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.1	12.0	0.4%	5%	----
Physical Tests (QC Lot: 1449192)											
VA24B0794-001	BA2419-A-1	Moisture	----	E144	0.25	%	18.1	19.8	8.89%	20%	----
Metals (QC Lot: 1449189)											
VA24B0794-001	BA2419-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	0.0698	0.0591	0.0107	Diff <2x LOR	----
Metals (QC Lot: 1449190)											
VA24B0794-001	BA2419-A-1	Aluminum	7429-90-5	E440	50	mg/kg	40300	39000	3.28%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	102	91.5	11.0%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	20.8	17.2	18.7%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	585	578	1.21%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.38	0.005	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	7.53	5.03	39.8%	30%	DUP-H
		Boron	7440-42-8	E440	5.0	mg/kg	218	255	15.6%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	10.5	8.23	24.6%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	153000	128000	18.3%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	216	291	29.2%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	59.0	139	80.6%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1230	1320	6.97%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	37800	39700	4.90%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	459	435	5.38%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	28.8	26.3	8.98%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	13700	12100	13.0%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	803	787	1.93%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	37.4	35.6	4.95%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	154	94.4	48.0%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	9170	7250	23.4%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	5980	5120	15.5%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.30	0.37	0.06	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	7.80	3.49	76.5%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	18200	15400	16.5%	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: 1449190) - continued											
VA24B0794-001	BA2419-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	318	283	11.9%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	12400	9200	29.3%	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	81.9	69.1	16.9%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	328	479	37.3%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	13.0	12.6	3.00%	30%	----
		Uranium	7440-61-1	E440	0.050	mg/kg	3.06	2.63	14.9%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	43.8	39.5	10.3%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3380	2760	20.0%	30%	----
Zirconium	7440-67-7	E440	1.0	mg/kg	2.4	1.7	0.7	Diff <2x LOR	----		
TCLP Metals (QC Lot: 1447247)											
VA24B0794-001	BA2419-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	----
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	----
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	2.00	1.97	0.03	Diff <2x LOR	----
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.149	0.153	0.004	Diff <2x LOR	----
		Calcium, TCLP	7440-70-2	E444	10	mg/L	2330	2370	1.62%	30%	----
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.856	0.885	3.26%	30%	----
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	0.652	0.658	0.842%	30%	----
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	----
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	110	113	2.61%	30%	----
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.35	0.36	0.005	Diff <2x LOR	----
		Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----		
Zinc, TCLP	7440-66-6	E444	0.50	mg/L	15.2	15.6	2.48%	30%	----		
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----		
TCLP Metals (QC Lot: 1447248)											
VA24B0794-001	BA2419-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----



Qualifiers

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



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: 1449192)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1449189)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1449190)						
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	---
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	---
Titanium	7440-32-6	E440	1	mg/kg	<1.0	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1449190) - continued						
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: 1447247)						
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	----
TCLP Metals (QCLot: 1447248)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1449191)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 1449192)									
Moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Metals (QCLot: 1449189)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	---
Metals (QCLot: 1449190)									
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	104	80.0	120	---
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	---
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	---
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	107	80.0	120	---
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	---
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	102	80.0	120	---
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	101	80.0	120	---
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	---
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	99.7	80.0	120	---
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	101	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	---
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	110	80.0	120	---
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	120	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	107	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	114	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	109	80.0	120	---
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	---
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	109	80.0	120	---
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	---
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	---
Thallium	7440-28-0	E440	0.05	mg/kg	100 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	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1449190) - continued									
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	106	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.5	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	108	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	108	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	110	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: 1447247)										
VA24B0794-001	BA2419-A-1	Antimony, TCLP	7440-36-0	E444	4.71 mg/L	5 mg/L	94.2	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	96.7	50.0	140	----
		Barium, TCLP	7440-39-3	E444	12.6 mg/L	12.5 mg/L	100	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.232 mg/L	0.25 mg/L	93.0	50.0	140	----
		Boron, TCLP	7440-42-8	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.224 mg/L	0.25 mg/L	89.7	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.13 mg/L	1.25 mg/L	90.5	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.16 mg/L	2.5 mg/L	86.3	50.0	140	----
		Iron, TCLP	7439-89-6	E444	220 mg/L	250 mg/L	88.0	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.22 mg/L	10 mg/L	92.2	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	2.24 mg/L	2.5 mg/L	89.6	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.66 mg/L	5 mg/L	93.2	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.070 mg/L	0.1 mg/L	69.7	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	93.0	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.83 mg/L	5 mg/L	96.6	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.0	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	ND mg/L	----	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.6 mg/L	1 mg/L	65.3	50.0	150	----
TCLP Metals (QCLot: 1447248)										
VA24B0794-001	BA2419-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	89.7	50.0	140	----



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:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1449189)									
QC-1449189-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	115	70.0	130	----
Metals (QCLot: 1449190)									
QC-1449190-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	122	70.0	130	----
QC-1449190-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	101	70.0	130	----
QC-1449190-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	109	70.0	130	----
QC-1449190-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	110	70.0	130	----
QC-1449190-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	116	70.0	130	----
QC-1449190-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	93.7	70.0	130	----
QC-1449190-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	107	70.0	130	----
QC-1449190-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	111	70.0	130	----
QC-1449190-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	102	70.0	130	----
QC-1449190-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	104	70.0	130	----
QC-1449190-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	108	70.0	130	----
QC-1449190-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	109	70.0	130	----
QC-1449190-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	107	70.0	130	----
QC-1449190-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	122	70.0	130	----
QC-1449190-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	122	70.0	130	----
QC-1449190-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	112	70.0	130	----
QC-1449190-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	107	70.0	130	----
QC-1449190-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	110	70.0	130	----
QC-1449190-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	113	70.0	130	----
QC-1449190-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	110	70.0	130	----
QC-1449190-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	98.3	60.0	140	----
QC-1449190-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	99.8	70.0	130	----
QC-1449190-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	106	70.0	130	----
QC-1449190-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	110	70.0	130	----
QC-1449190-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	112	50.0	150	----
QC-1449190-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	96.3	70.0	130	----
QC-1449190-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	104	40.0	160	----
QC-1449190-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	114	70.0	130	----
QC-1449190-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	122	70.0	130	----
QC-1449190-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	97.7	70.0	130	----
QC-1449190-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	106	70.0	130	----

Page : 11 of 11
 Work Order : VA24B0794
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 1449190) - continued									
QC-1449190-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	110	70.0	130	----
QC-1449190-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	107	70.0	130	----



ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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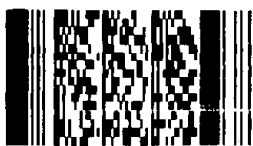
COC #

Page of

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company:	Covanta Energy		<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)						
Contact:	Nicole Victor / Dan Skrypnik		<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax	<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT				
Address:	5150 Riverbend Drive Burnaby BC		Email 1:	nvictor@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Phone:	604-521-1025	Fax:	Email 2:	ofetherstonhaugh@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		Analysis Request					
				brent.kirkpatrick@metrovancover.org							
				Sarah.Wellman@metrovancover.org							

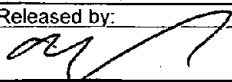
Invoice To			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)					
Same as Report ?			Job #:								
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite								
Company:			LSD: (includes 2:1 pH)								
Contact:			Quote #:								
Address:											
Phone:											

Lab Work Order #	B0794		ALS Contact:	Sampler:							
(lab use only)											

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
BA2419-A-1	Environmental Division Vancouver Work Order Reference VA24B0794  Telephone : +1 604 253 4188	08-May-24	9:00	Soil	X	X		X					1
BA2419-A-2		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-3		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-4		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-5		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-6		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-7		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-8		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-9		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-10		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-11		08-May-24	9:00	Soil	X	X		X					1
BA2419-A-12		08-May-24	9:00	Soil	X	X		X					1

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
	14-May-24	0800				21, 20 °C	AR	5/14/23	1:40pm	