

Bottom Ash Data

2024 Week 11

The following analytical report represents bottom ash composite results for week 11 of 2024 (March 10, 2024 to March 16, 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 : **VA24A5931**
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 : 20-Mar-2024 10:10
Date Analysis Commenced : 22-Mar-2024
Issue Date : 27-Mar-2024 17:12

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
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
Robin Weeks	Team Leader - Metals	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.

Qualifiers

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2411-A-1	BA2411-A-2	BA2411-A-3	BA2411-A-5	BA2411-A-5
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-001	VA24A5931-002	VA24A5931-003	VA24A5931-004	VA24A5931-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	22.3	22.6	23.0	21.8	22.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	12.4	12.4	12.4	12.4	12.4
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	33400	38300	29800	41100	52200
Antimony	7440-36-0	E440/VA	0.10	mg/kg	151	158	178	160	175
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	29.8	34.7	40.8	32.8	37.4
Barium	7440-39-3	E440/VA	0.50	mg/kg	472	526	409	385	445
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.37	0.39	0.35	0.33	0.33
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	9.60	10.9	11.4	11.8	11.2
Boron	7440-42-8	E440/VA	5.0	mg/kg	198	274	230	190	196
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	11.3	11.2	14.2	13.6	11.5
Calcium	7440-70-2	E440/VA	50	mg/kg	150000	173000	155000	152000	140000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	127	140	149	138	129
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	76.0	208	32.0	32.0	21.8
Copper	7440-50-8	E440/VA	0.50	mg/kg	7920	4880	9870	2240	3100
Iron	7439-89-6	E440/VA	50	mg/kg	57900	47200	37600	37600	34700
Lead	7439-92-1	E440/VA	0.50	mg/kg	467	345	1420	336	307
Lithium	7439-93-2	E440/VA	2.0	mg/kg	29.3	29.4	24.3	23.9	23.0
Magnesium	7439-95-4	E440/VA	20	mg/kg	11100	13300	12100	11500	10400
Manganese	7439-96-5	E440/VA	1.0	mg/kg	793	740	694	1160	723
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	0.0535	0.0562	0.0516	0.0539
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	23.7	28.1	22.6	21.6	21.4
Nickel	7440-02-0	E440/VA	0.50	mg/kg	537	132	1900	123	194
Phosphorus	7723-14-0	E440/VA	50	mg/kg	6920	10000	8140	7420	7890
Potassium	7440-09-7	E440/VA	100	mg/kg	6460	7020	7150	6790	6540
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.49	0.60	0.52	0.48	0.52
Silver	7440-22-4	E440/VA	0.10	mg/kg	12.8	6.59	5.94	8.16	5.70
Sodium	7440-23-5	E440/VA	50	mg/kg	16900	17700	17400	16700	16400
Strontium	7440-24-6	E440/VA	0.50	mg/kg	331	318	314	299	291



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2411-A-1	BA2411-A-2	BA2411-A-3	BA2411-A-5	BA2411-A-5
(Matrix: Soil/Solid)					Client sampling date / time	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-001	VA24A5931-002	VA24A5931-003	VA24A5931-004	VA24A5931-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13500	14000	13800	13400	12800	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	0.077	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	185	128	246	123	148	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	421	373	298	516	1320	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	16.2	12.7	11.9	9.29	8.31	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.56	2.81	3.02	2.78	2.75	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	35.6	36.5	41.7	38.4	40.3	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3740	4290	4010	8910	3100	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.7	2.0	1.9	2.6	4.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.5	12.5	12.4	12.4	12.4	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	10.5	10.3	9.85	9.55	8.93	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444/VA	0.010	pH units	8.31	8.30	8.14	8.11	7.95	
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	1.97	1.99	2.00	2.03	2.22	
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	1990	1980	1970	2020	2020	
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	0.081	0.074	0.068	0.120	0.116	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.576	0.537	0.646	0.666	0.625	
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	107	108	106	110	113	
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	BA2411-A-1	BA2411-A-2	BA2411-A-3	BA2411-A-5	BA2411-A-5
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-001	VA24A5931-002	VA24A5931-003	VA24A5931-004	VA24A5931-005	
					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	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<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	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<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	<0.50
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<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					Client sample ID				
(Matrix: Soil/Solid)					BA2411-A-6	BA2411-A-7	BA2411-A-8	BA2411-A-9	BA2411-A-10
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-006	VA24A5931-007	VA24A5931-008	VA24A5931-009	VA24A5931-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	21.8	22.8	23.0	22.1	23.2
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.3	12.4	12.5	12.4	12.4
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	35400	35500	33300	30600	33800
Antimony	7440-36-0	E440/VA	0.10	mg/kg	124	144	145	162	148
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	27.6	35.6	38.6	48.7	37.1
Barium	7440-39-3	E440/VA	0.50	mg/kg	430	428	424	443	446
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.33	0.67	0.34	0.33
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.7	9.62	11.1	12.4	11.6
Boron	7440-42-8	E440/VA	5.0	mg/kg	248	184	211	200	200
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	12.8	11.9	11.6	15.0	11.8
Calcium	7440-70-2	E440/VA	50	mg/kg	148000	142000	153000	166000	148000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	112	123	128	178	144
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	28.7	103	79.5	68.8	61.5
Copper	7440-50-8	E440/VA	0.50	mg/kg	1550	14700	6260	2670	13000
Iron	7439-89-6	E440/VA	50	mg/kg	37200	39400	53700	45900	47400
Lead	7439-92-1	E440/VA	0.50	mg/kg	288	646	424	388	513
Lithium	7439-93-2	E440/VA	2.0	mg/kg	40.8	23.3	73.6	26.8	22.0
Magnesium	7439-95-4	E440/VA	20	mg/kg	11000	11100	12200	13400	12100
Manganese	7439-96-5	E440/VA	1.0	mg/kg	1050	728	911	781	808
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0573	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	23.8	20.1	22.6	26.4	20.4
Nickel	7440-02-0	E440/VA	0.50	mg/kg	131	201	206	272	157
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7330	6820	8670	9030	7100
Potassium	7440-09-7	E440/VA	100	mg/kg	6530	5220	6300	6060	5800
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.44	0.71	0.50	0.54	0.59
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.07	7.79	6.18	16.5	>48.9
Sodium	7440-23-5	E440/VA	50	mg/kg	17000	13600	16200	16000	16100
Strontium	7440-24-6	E440/VA	0.50	mg/kg	363	294	319	349	292
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11500	13000	13800	14500	12700



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2411-A-6	BA2411-A-7	BA2411-A-8	BA2411-A-9	BA2411-A-10
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-006	VA24A5931-007	VA24A5931-008	VA24A5931-009	VA24A5931-010	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	98.2	162	277	149	141	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	292	530	253	268	328	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	9.57	10.3	17.4	14.7	14.4	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.75	2.65	2.78	3.17	2.68	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	35.0	35.2	35.5	38.0	35.8	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	2990	5600	4380	5550	7820	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.6	<2.0 ^{DLM}	1.6	<2.0 ^{DLM}	1.7	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.4	12.5	12.5	12.5	12.4	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	9.36	10.5	10.9	10.2	10.4	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444/VA	0.010	pH units	8.14	8.25	8.07	8.04	8.35	
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	2.03	2.06	2.15	2.19	2.04	
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	1990	2050	2160	2160	1940	
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	0.076	0.076	0.072	0.157	0.057	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.622	0.555	0.547	0.594	0.556	
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	113	113	116	124	107	
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	<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					Client sample ID				
(Matrix: Soil/Solid)					BA2411-A-6	BA2411-A-7	BA2411-A-8	BA2411-A-9	BA2411-A-10
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00	13-Mar-2024 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-006	VA24A5931-007	VA24A5931-008	VA24A5931-009	VA24A5931-010
					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					Client sample ID				
(Matrix: Soil/Solid)					BA2411-A-11	BA2411-A-12	----	----	----
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-011	VA24A5931-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	22.6	21.8	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	12.4	12.4	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	32300	42200	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	161	340	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	35.6	302	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	426	462	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.34	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	12.6	11.4	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	210	162	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	15.1	11.1	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	154000	143000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	129	113	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	75.2	43.1	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	2010	5850	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	36600	41300	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	330	8180	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	29.7	22.5	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11700	11400	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	989	744	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.116	0.0546	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	19.4	16.9	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	207	151	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7740	8900	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	7110	6420	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.94	0.56	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	6.30	10.9	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	17400	16200	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	297	300	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13500	11600	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2411-A-11	BA2411-A-12	----	----	----
Client sampling date / time					13-Mar-2024 09:00	13-Mar-2024 09:00	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-011	VA24A5931-012	-----	-----	-----
					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	134	110	---	---	---
Titanium	7440-32-6	E440/VA	1.0	mg/kg	343	443	---	---	---
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	9.55	15.1	---	---	---
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.24	2.82	---	---	---
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	43.6	38.0	---	---	---
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3680	4540	---	---	---
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	1.8	2.7	---	---	---
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.5	12.5	---	---	---
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	10.7	10.6	---	---	---
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.89	2.89	---	---	---
pH, TCLP final	----	EPP444/VA	0.010	pH units	7.76	7.98	---	---	---
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	2.22	2.15	---	---	---
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	<0.050	<0.050	---	---	---
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2160	2160	---	---	---
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	0.230	0.229	---	---	---
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.759	0.606	---	---	---
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	121	121	---	---	---
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					Client sample ID		BA2411-A-11	BA2411-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		13-Mar-2024 09:00	13-Mar-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24A5931-011	VA24A5931-012	-----	-----	-----	-----	-----
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	<0.50	<0.50	---	---	---	---	---
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	---	---	---	---	---

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

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



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA24A5931</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 15</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 : 20-Mar-2024 10:10</p> <p>Issue Date : 27-Mar-2024 17:12</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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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
Method Blank (MB) Values								
Metals	QC-MRG2-1380743 001	----	Antimony	7440-36-0	E440	0.14 ^B mg/kg	0.1 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

Duplicate (DUP) RPDs								
Metals	VA24A5931-001	BA2411-A-1	Cobalt	7440-48-4	E440	53.1 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Copper	7440-50-8	E440	119 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Iron	7439-89-6	E440	31.3 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Nickel	7440-02-0	E440	101 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Silver	7440-22-4	E440	85.1 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Titanium	7440-32-6	E440	46.7 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24A5931-001	BA2411-A-1	Tungsten	7440-33-7	E440	50.2 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group : 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 BA2411-A-1	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-10	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-11	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-12	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-2	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-3	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-5, BA2411-A-5	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-6	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-7	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-8	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2411-A-9	E510	13-Mar-2024	27-Mar-2024	28 days	14 days	✔	27-Mar-2024	28 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-1	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-10	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-11	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-12	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-2	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-3	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-5, BA2411-A-5	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-6	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-7	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-8	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2411-A-9	E440	13-Mar-2024	27-Mar-2024	180 days	14 days	✔	27-Mar-2024	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2411-A-1	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2411-A-10	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2411-A-11	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-12	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-2	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-3	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-5, BA2411-A-5	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-6	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-7	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-8	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2411-A-9	E144	13-Mar-2024	----	----	----		26-Mar-2024	----	13 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2411-A-1	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-10	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-11	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-12	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-2	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-3	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-5, BA2411-A-5	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-6	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-7	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2411-A-8	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2411-A-9	E108	13-Mar-2024	27-Mar-2024	30 days	14 days	✔	27-Mar-2024	30 days	14 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-1	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-10	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-11	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-12	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-2	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-3	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-5, BA2411-A-5	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2411-A-6	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 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		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2411-A-7	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2411-A-8	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2411-A-9	E512	22-Mar-2024	23-Mar-2024	37 days	10 days	✔	23-Mar-2024	37 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-1	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-10	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-11	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-12	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-2	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-3	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-5, BA2411-A-5	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-6	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-7	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-8	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2411-A-9	E444	22-Mar-2024	23-Mar-2024	189 days	10 days	✔	25-Mar-2024	189 days	12 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-1	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-10	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-11	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-12	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔	



Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-2	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-3	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-5, BA2411-A-5	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-6	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-7	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-8	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2411-A-9	EPP444	13-Mar-2024	22-Mar-2024	----	----		----	28 days	9 days	✔

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	1380743	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1380744	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1380749	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1380745	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1380743	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1380744	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	1380749	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1380745	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1377886	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1380743	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1377887	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1380744	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	1380749	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1377886	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1377887	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, 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.



<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	: VA24A5931	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	: 20-Mar-2024 10:10
PO	: VANCO0000052919	Date Analysis Commenced	: 22-Mar-2024
C-O-C number	: ----	Issue Date	: 27-Mar-2024 17:12
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>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
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
Robin Weeks	Team Leader - Metals	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: 1380745)											
VA24A5931-001	BA2411-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	12.4	12.4	0.1%	5%	----
Physical Tests (QC Lot: 1380749)											
VA24A5931-001	BA2411-A-1	Moisture	----	E144	0.25	%	22.3	23.3	4.04%	20%	----
Metals (QC Lot: 1380743)											
VA24A5931-001	BA2411-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0582	0.0082	Diff <2x LOR	----
Metals (QC Lot: 1380744)											
VA24A5931-001	BA2411-A-1	Aluminum	7429-90-5	E440	50	mg/kg	33400	34400	3.12%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	151	151	0.252%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	29.8	34.3	14.0%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	472	421	11.4%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.41	0.05	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	9.60	10.9	12.9%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	198	221	11.1%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	11.3	12.3	8.53%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	150000	154000	2.80%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	127	139	9.07%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	76.0	131	53.1%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	7920	2000	119%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	57900	42200	31.3%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	467	400	15.6%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	29.3	32.4	10.2%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	11100	11300	1.59%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	793	799	0.738%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	23.7	19.3	20.6%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	537	177	101%	30%	DUP-H
		Phosphorus	7723-14-0	E440	50	mg/kg	6920	7430	7.07%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	6460	6400	0.975%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.49	0.50	0.009	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	12.8	5.17	85.1%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	16900	16100	4.92%	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: 1380744) - continued											
VA24A5931-001	BA2411-A-1	Strontium	7440-24-6	E440	0.50	mg/kg	331	481	37.0%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	13500	14000	3.96%	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	185	127	36.8%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	421	262	46.7%	40%	DUP-H
		Tungsten	7440-33-7	E440	0.50	mg/kg	16.2	9.67	50.2%	30%	DUP-H
		Uranium	7440-61-1	E440	0.050	mg/kg	2.56	2.91	12.7%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	35.6	37.4	4.87%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	3740	3760	0.490%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	1.7	2.5	0.8	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1380749)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1380743)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
Metals (QCLot: 1380744)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	---
Antimony	7440-36-0	E440	0.1	mg/kg	# 0.14	B
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: 1380744) - 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: 1377886)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1377887)						
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	----

Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



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: 1380745)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.5	95.0	105	---
Physical Tests (QCLot: 1380749)									
Moisture	---	E144	0.25	%	50 %	100	90.0	110	---
Metals (QCLot: 1380743)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	92.5	80.0	120	---
Metals (QCLot: 1380744)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	94.6	80.0	120	---
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	101	80.0	120	---
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.4	80.0	120	---
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	98.9	80.0	120	---
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	85.4	80.0	120	---
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	90.7	80.0	120	---
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	86.8	80.0	120	---
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	92.4	80.0	120	---
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	89.7	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	94.7	80.0	120	---
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	91.0	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	89.2	80.0	120	---
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	91.0	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	89.5	80.0	120	---
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	85.1	80.0	120	---
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	94.3	80.0	120	---
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.3	80.0	120	---
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.0	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	91.7	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	102	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.2	80.0	120	---
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	92.2	80.0	120	---
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	89.1	80.0	120	---
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	96.6	80.0	120	---
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	100	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: 1380744) - continued									
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	89.2	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	88.3	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	96.0	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	96.3	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	94.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	96.0	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	94.1	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	87.6	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	99.4	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: 1377886)										
VA24A5931-001	BA2411-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	98.1	50.0	140	----
TCLP Metals (QCLot: 1377887)										
VA24A5931-001	BA2411-A-1	Antimony, TCLP	7440-36-0	E444	4.79 mg/L	5 mg/L	95.8	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	101	50.0	140	----
		Barium, TCLP	7440-39-3	E444	11.9 mg/L	12.5 mg/L	95.2	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.236 mg/L	0.25 mg/L	94.3	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.33 mg/L	10 mg/L	93.3	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.228 mg/L	0.25 mg/L	91.0	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	1.18 mg/L	1.25 mg/L	94.0	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	0.234 mg/L	0.25 mg/L	93.7	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.21 mg/L	2.5 mg/L	88.3	50.0	140	----
		Iron, TCLP	7439-89-6	E444	225 mg/L	250 mg/L	90.2	50.0	140	----
		Lead, TCLP	7439-92-1	E444	8.54 mg/L	10 mg/L	85.4	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	242 mg/L	250 mg/L	96.8	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.29 mg/L	2.5 mg/L	91.8	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.55 mg/L	5 mg/L	90.9	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.079 mg/L	0.1 mg/L	78.9	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.3 mg/L	5 mg/L	86.3	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.72 mg/L	5 mg/L	94.5	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	96.5	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	8.97 mg/L	10 mg/L	89.7	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	77.0	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:

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: 1380743)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	104	70.0	130	----
Metals (QCLot: 1380744)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	103	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	98.0	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	105	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	103	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	110	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	127	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	109	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	100	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	112	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	98.9	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	96.4	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	98.0	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	94.9	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	105	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	94.8	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	99.9	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	91.9	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	115	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	102	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	98.7	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	98.2	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	91.4	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----

Page : 11 of 11
 Work Order : VA24A5931
 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: 1380744) - continued									
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	107	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	105	70.0	130	----
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	92.5	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	99.8	70.0	130	----



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	Email 1:	nvictor@covanta.com	<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
	Burnaby BC	Email 2:	ofetherstonhaugh@covanta.com	<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Fax:		Analysis Request	
	<input type="checkbox"/> Yes <input type="checkbox"/> No				
	<input type="checkbox"/> Yes <input type="checkbox"/> No				
		Email 3:	dskrypnik@covanta.com		
			brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

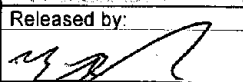
Invoice To Same as Report ?		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)							
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Job #:									
Company:		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite								
Contact: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

Lab Work Order #	AS93	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
					X	X			X	X	
BA2411-A-1	Environmental Division Vancouver Work Order Reference VA24A5931  Telephone : +1 604 253 4188	13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-2		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-3		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-4		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-5		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-6		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-7		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-8		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-9		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-10		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-11		13-Mar-24	9:00	Soil	X	X			X		1
BA2411-A-12		13-Mar-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:
	20-MAR-24	8:50				°C	JC 19319	20-3-24	10/10a	Yes / No ? If Yes add SIF