

Bottom Ash Data

2023 Week 47

The following analytical report represents bottom ash composite results for week 47 of 2023 (November 19, 2023 to November 25 2023).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.



CERTIFICATE OF ANALYSIS

<p>Work Order : VA23C8725</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 : VANCO0000051998</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 11</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Ian Chen</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 29-Nov-2023 13:50</p> <p>Date Analysis Commenced : 02-Dec-2023</p> <p>Issue Date : 06-Dec-2023 17:56</p>
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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
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Organics, Burnaby, British Columbia



General Comments

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

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

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

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

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

<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					Client sample ID				
(Matrix: Soil/Solid)					BA2347-A-1	BA2347-A-2	BA2347-A-3	BA2347-A-4	BA2347-A-5
Client sampling date / time					22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-001	VA23C8725-002	VA23C8725-003	VA23C8725-004	VA23C8725-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/VA	0.25	%	24.6	25.1	24.5	23.9	24.5
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.6	11.8	11.7	11.2	11.2
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	28000	29000	30100	32300	35600
Antimony	7440-36-0	E440/VA	0.10	mg/kg	138	121	114	103	105
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	22.1	26.5	33.6	20.3	19.9
Barium	7440-39-3	E440/VA	0.50	mg/kg	456	424	484	507	510
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.34	0.38	0.35	0.34	0.33
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	35.8	7.53	7.38	5.66	5.46
Boron	7440-42-8	E440/VA	5.0	mg/kg	190	194	140	162	154
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.8	14.6	10.4	21.6	10.6
Calcium	7440-70-2	E440/VA	50	mg/kg	135000	154000	140000	131000	129000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	222	168	150	176	184
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	43.4	50.6	108	72.2	168
Copper	7440-50-8	E440/VA	0.50	mg/kg	10200	23600	1430	3500	1500
Iron	7439-89-6	E440/VA	50	mg/kg	65300	45100	62100	56500	57800
Lead	7439-92-1	E440/VA	0.50	mg/kg	8420	957	365	835	328
Lithium	7439-93-2	E440/VA	2.0	mg/kg	31.7	25.8	27.3	36.3	29.8
Magnesium	7439-95-4	E440/VA	20	mg/kg	10400	12300	11000	10900	10700
Manganese	7439-96-5	E440/VA	1.0	mg/kg	1030	820	870	867	833
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	21.0	22.7	17.1	20.9	24.1
Nickel	7440-02-0	E440/VA	0.50	mg/kg	148	135	140	256	167
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7880	9550	10100	7530	8410
Potassium	7440-09-7	E440/VA	100	mg/kg	5260	6300	4900	6200	5470
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.34	0.38	0.38	0.40	0.34
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.40	6.95	4.26	4.04	5.94
Sodium	7440-23-5	E440/VA	50	mg/kg	14100	16800	14300	15700	13400
Strontium	7440-24-6	E440/VA	0.50	mg/kg	376	331	277	276	274



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2347-A-1	BA2347-A-2	BA2347-A-3	BA2347-A-4	BA2347-A-5
(Matrix: Soil/Solid)					Client sampling date / time	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-001	VA23C8725-002	VA23C8725-003	VA23C8725-004	VA23C8725-005	
					Result	Result	Result	Result	Result	
Metals										
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13000	14800	13200	12700	13200	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	0.090	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	148	122	84.4	151	86.9	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	308	186	276	288	324	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	6.39	8.26	9.77	8.07	6.42	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.13	3.66	3.08	3.09	3.30	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	50.6	48.4	43.0	44.4	47.4	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3940	7570	3270	3200	4020	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.7	3.2	2.3	2.6	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.6	11.7	11.6	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.01	6.43	5.89	6.99	6.71	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.90	6.78	6.74	6.77	6.90	
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	2.08	2.16	1.94	2.10	2.03	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.089	0.153	0.090	0.244	0.094	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2100	2350	1930	2110	2050	
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	0.884	0.742	0.956	0.849	0.642	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.727	0.830	0.699	0.967	0.806	
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	118	136	114	125	118	
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	0.33	0.35	0.31	0.41	0.28	
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	BA2347-A-1	BA2347-A-2	BA2347-A-3	BA2347-A-4	BA2347-A-5
Client sampling date / time					22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-001	VA23C8725-002	VA23C8725-003	VA23C8725-004	VA23C8725-005	
					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	7.22	13.4	9.00	10.9	5.51	
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)					BA2347-A-6	BA2347-A-7	BA2347-A-8	BA2347-A-9	BA2347-A-10
Client sampling date / time					22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-006	VA23C8725-007	VA23C8725-008	VA23C8725-009	VA23C8725-010
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	---	E144/VA	0.25	%	24.6	26.0	25.1	26.3	21.8
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.3	11.5	11.3	11.3	11.4
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	32200	37300	31800	44400	35900
Antimony	7440-36-0	E440/VA	0.10	mg/kg	155	102	126	140	103
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	21.7	18.5	19.4	18.5	16.6
Barium	7440-39-3	E440/VA	0.50	mg/kg	524	537	451	496	455
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.34	0.32	0.32	0.33
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.58	6.11	5.48	6.36	5.50
Boron	7440-42-8	E440/VA	5.0	mg/kg	134	148	126	174	179
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	9.37	9.56	17.1	8.76	9.28
Calcium	7440-70-2	E440/VA	50	mg/kg	135000	122000	126000	127000	133000
Chromium	7440-47-3	E440/VA	0.50	mg/kg	315	188	138	300	179
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	55.3	36.3	45.8	77.4	37.3
Copper	7440-50-8	E440/VA	0.50	mg/kg	3440	1680	21200	5010	2680
Iron	7439-89-6	E440/VA	50	mg/kg	63500	51500	43600	53100	48700
Lead	7439-92-1	E440/VA	0.50	mg/kg	708	411	1240	339	2410
Lithium	7439-93-2	E440/VA	2.0	mg/kg	22.6	21.8	31.4	23.1	23.5
Magnesium	7439-95-4	E440/VA	20	mg/kg	10700	10300	10800	10600	11500
Manganese	7439-96-5	E440/VA	1.0	mg/kg	798	740	679	728	670
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	25.5	18.4	16.9	34.6	21.0
Nickel	7440-02-0	E440/VA	0.50	mg/kg	236	349	128	8100	157
Phosphorus	7723-14-0	E440/VA	50	mg/kg	8740	8420	8320	8150	8130
Potassium	7440-09-7	E440/VA	100	mg/kg	5250	5710	4980	4820	6020
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.37	0.37	0.28	0.28	0.29
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.27	4.06	6.74	9.62	4.24
Sodium	7440-23-5	E440/VA	50	mg/kg	14700	15000	12900	13500	15800
Strontium	7440-24-6	E440/VA	0.50	mg/kg	321	284	296	278	305
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13100	12700	12300	12500	12400



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2347-A-6	BA2347-A-7	BA2347-A-8	BA2347-A-9	BA2347-A-10
(Matrix: Soil/Solid)					Client sampling date / time	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-006	VA23C8725-007	VA23C8725-008	VA23C8725-009	VA23C8725-010	
					Result	Result	Result	Result	Result	
Metals										
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	0.052	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	173	81.0	108	88.6	99.3	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	252	361	304	670	284	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	6.95	9.36	7.12	8.00	8.10	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	3.18	3.20	3.15	3.01	3.04	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	56.6	47.0	43.3	41.4	42.5	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3830	2870	3130	7760	3000	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	3.0	2.8	2.6	2.6	3.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.8	11.8	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.43	7.10	6.48	6.93	6.91	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.88	6.87	6.87	6.81	6.97	
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	2.09	2.14	2.32	2.14	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.142	0.143	0.093	0.098	0.104	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1970	2100	2130	2270	2040	
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	0.520	0.776	1.00	1.23	0.807	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.887	0.965	0.914	0.882	0.743	
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	115	132	126	136	117	
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	<0.25	0.30	0.34	0.38	<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)					BA2347-A-6	BA2347-A-7	BA2347-A-8	BA2347-A-9	BA2347-A-10
Client sampling date / time					22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00	22-Nov-2023 09:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-006	VA23C8725-007	VA23C8725-008	VA23C8725-009	VA23C8725-010
					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	10.9	6.36	10.4	9.18	5.50
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)					BA2347-A-11	BA2347-A-12	----	----	----
Client sampling date / time					22-Nov-2023 09:00	22-Nov-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-011	VA23C8725-012	-----	-----	-----
					Result	Result	----	----	----
Physical Tests									
Moisture	---	E144/VA	0.25	%	27.6	25.6	----	----	----
pH (1:2 soil:water)	---	E108/VA	0.10	pH units	11.4	11.2	----	----	----
Metals									
Aluminum	7429-90-5	E440/VA	50	mg/kg	30300	36200	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	99.9	263	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	20.3	22.2	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	534	514	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.36	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	207	5.56	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	142	210	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	10.7	16.0	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	126000	123000	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	125	154	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	36.2	108	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	4520	2970	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	42800	51200	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	306	3520	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	31.4	30.7	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11000	9850	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	635	779	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	0.0854	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	16.4	21.2	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	155	251	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	7670	7390	----	----	----
Potassium	7440-09-7	E440/VA	100	mg/kg	5200	5640	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.22	0.38	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	3.89	11.6	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	13700	15000	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	276	275	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	11500	13000	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2347-A-11	BA2347-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	22-Nov-2023 09:00	22-Nov-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-011	VA23C8725-012	-----	-----	-----	
					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	78.7	121	---	---	---	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	224	355	---	---	---	
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	7.18	7.02	---	---	---	
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.79	2.91	---	---	---	
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	39.8	43.3	---	---	---	
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4980	2960	---	---	---	
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.6	2.1	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	11.8	11.7	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.13	6.76	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.91	2.91	---	---	---	
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.74	6.72	---	---	---	
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	2.40	2.06	---	---	---	
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.127	0.126	---	---	---	
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2350	2110	---	---	---	
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	0.691	1.30	---	---	---	
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	0.624	1.00	---	---	---	
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	132	123	---	---	---	
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	0.37	0.35	---	---	---	
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		BA2347-A-11	BA2347-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		22-Nov-2023 09:00	22-Nov-2023 09:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C8725-011	VA23C8725-012	-----	-----	-----	-----	-----
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	16.0	14.2	---	---	---	---	---
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 : VA23C8725</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 : VANCO0000051998</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</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 : 29-Nov-2023 13:50</p> <p>Issue Date : 06-Dec-2023 17:56</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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- 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.



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 BA2347-A-1	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-10	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-11	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-12	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-2	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-3	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-4	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	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 BA2347-A-5	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-6	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-7	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-8	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2347-A-9	E510	22-Nov-2023	05-Dec-2023	28 days	13 days	✔	06-Dec-2023	28 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-1	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-10	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-11	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-12	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	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 BA2347-A-2	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-3	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-4	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-5	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-6	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-7	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-8	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2347-A-9	E440	22-Nov-2023	05-Dec-2023	180 days	13 days	✔	06-Dec-2023	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2347-A-1	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	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 BA2347-A-10	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-11	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-12	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-2	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-3	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-4	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-5	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-6	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2347-A-7	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	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 BA2347-A-8	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2347-A-9	E144	22-Nov-2023	----	----	----		05-Dec-2023	----	13 days		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-1	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-10	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-11	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-12	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-2	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-3	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-4	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	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 BA2347-A-5	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-6	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-7	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-8	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2347-A-9	E108	22-Nov-2023	06-Dec-2023	30 days	14 days	✔	06-Dec-2023	30 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2347-A-1	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2347-A-10	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2347-A-11	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2347-A-12	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 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	
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-2	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-3	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-4	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-5	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-6	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-7	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-8	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2347-A-9	E512	02-Dec-2023	03-Dec-2023	38 days	11 days	✔	03-Dec-2023	38 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2347-A-1	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 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) BA2347-A-10	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-11	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-12	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-2	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-3	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-4	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-5	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-6	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-7	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✔	04-Dec-2023	190 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) BA2347-A-8	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✓	04-Dec-2023	190 days	12 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2347-A-9	E444	02-Dec-2023	03-Dec-2023	190 days	11 days	✓	04-Dec-2023	190 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) BA2347-A-1	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-10	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-11	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-12	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-2	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-3	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-4	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 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 : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-5	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-6	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-7	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-8	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2347-A-9	EPP444	22-Nov-2023	02-Dec-2023	----	----		----	28 days	10 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	1264770	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1264769	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	1264775	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1264771	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1264770	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1264769	2	16	12.5	10.0	✔
Moisture Content by Gravimetry	E144	1264775	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1264771	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1262461	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1264770	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1262462	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1264769	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	1264775	1	16	6.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1262461	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1262462	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.



<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	: VA23C8725	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	: 29-Nov-2023 13:50
PO	: VANCO0000051998	Date Analysis Commenced	: 02-Dec-2023
C-O-C number	: ----	Issue Date	: 06-Dec-2023 17:56
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

<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
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Organics, Burnaby, British Columbia



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1264771)											
VA23C8725-001	BA2347-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.6	11.2	3.2%	5%	----
Physical Tests (QC Lot: 1264775)											
VA23C8720-002	Anonymous	Moisture	----	E144	0.25	%	19.5	19.0	2.68%	20%	----
Metals (QC Lot: 1264769)											
VA23C8720-002	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	18300	16900	8.26%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.56	0.50	0.06	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	7.84	7.59	3.24%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	166	167	0.550%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.32	0.31	0.01	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.222	0.221	0.118%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	18000	16300	9.63%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	22.0	21.6	2.14%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	10.5	10.4	0.667%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	25.3	24.1	4.80%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	32800	31800	2.94%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	6.11	5.88	3.85%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	9.2	8.7	0.5	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	7220	6920	4.25%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	761	752	1.26%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.67	0.45	39.6%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	17.0	16.6	2.37%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	697	653	6.56%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	1040	1020	1.19%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	857	815	4.97%	40%	----
		Strontium	7440-24-6	E440	0.50	mg/kg	108	107	0.674%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----



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: 1264769) - continued											
VA23C8720-002	Anonymous	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	<2.0	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	1180	1090	7.43%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.692	0.672	2.97%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	80.0	76.3	4.73%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	65.2	63.7	2.32%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	6.7	6.4	0.2	Diff <2x LOR	----
Metals (QC Lot: 1264770)											
VA23C8725-001	BA2347-A-1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----



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: 1264775)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1264769)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	---
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	---
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	---
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	---
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	---
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	---
Boron	7440-42-8	E440	5	mg/kg	<5.0	---
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	---
Calcium	7440-70-2	E440	50	mg/kg	<50	---
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	---
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	---
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	---
Iron	7439-89-6	E440	50	mg/kg	<50	---
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	---
Lithium	7439-93-2	E440	2	mg/kg	<2.0	---
Magnesium	7439-95-4	E440	20	mg/kg	<20	---
Manganese	7439-96-5	E440	1	mg/kg	<1.0	---
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	---
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	---
Phosphorus	7723-14-0	E440	50	mg/kg	<50	---
Potassium	7440-09-7	E440	100	mg/kg	<100	---
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	---
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	---
Sodium	7440-23-5	E440	50	mg/kg	<50	---
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	---
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	---
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	---
Tin	7440-31-5	E440	2	mg/kg	<2.0	---
Titanium	7440-32-6	E440	1	mg/kg	<1.0	---
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1264769) - continued						
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	----
Metals (QCLot: 1264770)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 1262461)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 1262462)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	----
Arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
Boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
Cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
Calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
Cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
Copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
Iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
Nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
Selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
Silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
Thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
Uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
Zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1264771)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1264775)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 1264769)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	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	101	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	98.4	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	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	106	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	100	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	99.7	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	109	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	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: 1264769) - continued									
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.2	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	106	80.0	120	----
Metals (QCLot: 1264770)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	109	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Soil/Solid

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 1262461)										
VA23C8725-001	BA2347-A-1	Mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	101	50.0	140	----
TCLP Metals (QCLot: 1262462)										
VA23C8725-001	BA2347-A-1	Antimony, TCLP	7440-36-0	E444	4.77 mg/L	5 mg/L	95.4	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	12.6 mg/L	12.5 mg/L	101	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.235 mg/L	0.25 mg/L	94.0	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.43 mg/L	10 mg/L	94.3	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	250 mg/L	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.15 mg/L	1.25 mg/L	91.8	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.22 mg/L	2.5 mg/L	89.0	50.0	140	----
		Iron, TCLP	7439-89-6	E444	233 mg/L	250 mg/L	93.2	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.56 mg/L	10 mg/L	95.6	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	244 mg/L	250 mg/L	97.5	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.33 mg/L	2.5 mg/L	93.2	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	4.76 mg/L	5 mg/L	95.2	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.079 mg/L	0.1 mg/L	79.5	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	95.0	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.81 mg/L	5 mg/L	96.2	50.0	150	----
		Vanadium, TCLP	7440-62-2	E444	0.74 mg/L	0.75 mg/L	98.9	50.0	140	----
		Zinc, TCLP	7440-66-6	E444	8.37 mg/L	10 mg/L	83.7	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.8 mg/L	1 mg/L	81.9	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: 1264769)									
	SCP SS-2	Aluminum	7429-90-5	E440	9817 mg/kg	114	70.0	130	----
	SCP SS-2	Antimony	7440-36-0	E440	3.99 mg/kg	109	70.0	130	----
	SCP SS-2	Arsenic	7440-38-2	E440	3.73 mg/kg	108	70.0	130	----
	SCP SS-2	Barium	7440-39-3	E440	105 mg/kg	110	70.0	130	----
	SCP SS-2	Beryllium	7440-41-7	E440	0.349 mg/kg	115	70.0	130	----
	SCP SS-2	Boron	7440-42-8	E440	8.5 mg/kg	128	40.0	160	----
	SCP SS-2	Cadmium	7440-43-9	E440	0.91 mg/kg	111	70.0	130	----
	SCP SS-2	Calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
	SCP SS-2	Chromium	7440-47-3	E440	101 mg/kg	123	70.0	130	----
	SCP SS-2	Cobalt	7440-48-4	E440	6.9 mg/kg	107	70.0	130	----
	SCP SS-2	Copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
	SCP SS-2	Iron	7439-89-6	E440	23558 mg/kg	111	70.0	130	----
	SCP SS-2	Lead	7439-92-1	E440	267 mg/kg	100	70.0	130	----
	SCP SS-2	Lithium	7439-93-2	E440	9.5 mg/kg	109	70.0	130	----
	SCP SS-2	Magnesium	7439-95-4	E440	5509 mg/kg	110	70.0	130	----
	SCP SS-2	Manganese	7439-96-5	E440	269 mg/kg	115	70.0	130	----
	SCP SS-2	Molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	----
	SCP SS-2	Nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
	SCP SS-2	Phosphorus	7723-14-0	E440	752 mg/kg	98.4	70.0	130	----
	SCP SS-2	Potassium	7440-09-7	E440	1587 mg/kg	121	70.0	130	----
	SCP SS-2	Sodium	7440-23-5	E440	797 mg/kg	113	70.0	130	----
	SCP SS-2	Strontium	7440-24-6	E440	86.1 mg/kg	107	70.0	130	----
	SCP SS-2	Thallium	7440-28-0	E440	0.0786 mg/kg	98.6	40.0	160	----
	SCP SS-2	Tin	7440-31-5	E440	10.6 mg/kg	97.6	70.0	130	----
	SCP SS-2	Titanium	7440-32-6	E440	839 mg/kg	124	70.0	130	----
	SCP SS-2	Uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
	SCP SS-2	Vanadium	7440-62-2	E440	32.7 mg/kg	114	70.0	130	----

Page : 11 of 11
 Work Order : VA23C8725
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



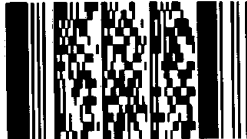
Sub-Matrix:

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: 1264769) - continued									
	SCP SS-2	Zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
	SCP SS-2	Zirconium	7440-67-7	E440	5.73 mg/kg	111	70.0	130	----
Metals (QCLot: 1264770)									
	SCP SS-2	Mercury	7439-97-6	E510	0.059 mg/kg	110	70.0	130	----



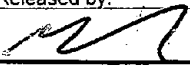
Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)		
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)		
Contact:	Nicole Victor / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax	
Address:	5150 Riverbend Drive Burnaby BC	Email 1:	nvictor@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Email 2:	ofetherstonhaugh@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
	Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
			brent.kirkpatrick@metrovancover.org		Analysis Request	
			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 #:				MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers
Company:		PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite							
Contact:		LSD:	(Includes 2:1 pH)							
Address:		Quote #:								
Phone:		ALS Contact:		Sampler:						
Lab Work Order # (lab use only)	8729									

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
BA2347-A-1	Environmental Division Vancouver Work Order Reference VA23C8725  Telephone : +1 604 253 4188	22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-2		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-3		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-4		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-5		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-6		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-7		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-8		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-9		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-10		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-11		22-Nov-23	9:00	Soil	X	X		X	1
BA2347-A-12		22-Nov-23	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
	29-Nov-23	0800	JL	NOV 29 2023	1350	16 °C				