

Bottom Ash Data

2022 Week 39

The following analytical report represents bottom ash composite results for week 39 of 2022 (September 25, 2022 to October 1, 2022).

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 : **VA22C3844**
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 : VANCO 0000051213
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 04-Oct-2022 13:10
Date Analysis Commenced : 05-Oct-2022
Issue Date : 14-Oct-2022 16:42

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>
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Qammar Almas	Lab Assistant	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2239-A-1	BA2239-A-2	BA2239-A-3	BA2239-A-4	BA2239-A-5
(Matrix: Soil/Solid)					Client sampling date / time	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-001	VA22C3844-002	VA22C3844-003	VA22C3844-004	VA22C3844-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.7	22.7	19.2	22.5	21.1	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.4	10.2	10.3	10.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	44800	37900	37100	30500	28400	
antimony	7440-36-0	E440	0.10	mg/kg	108	126	103	196	131	
arsenic	7440-38-2	E440	0.10	mg/kg	22.4	27.4	22.7	24.9	23.3	
barium	7440-39-3	E440	0.50	mg/kg	561	632	522	444	491	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.40	0.34	0.35	0.34	
bismuth	7440-69-9	E440	0.20	mg/kg	6.67	6.58	5.86	21.8	12.0	
boron	7440-42-8	E440	5.0	mg/kg	171	191	223	233	147	
cadmium	7440-43-9	E440	0.020	mg/kg	12.8	12.7	12.5	342	11.2	
calcium	7440-70-2	E440	50	mg/kg	127000	138000	133000	126000	121000	
chromium	7440-47-3	E440	0.50	mg/kg	184	192	172	173	162	
cobalt	7440-48-4	E440	0.10	mg/kg	162	74.2	57.4	44.7	54.1	
copper	7440-50-8	E440	0.50	mg/kg	4830	2160	4250	3470	6940	
iron	7439-89-6	E440	50	mg/kg	60600	72400	64700	76200	83300	
lead	7439-92-1	E440	0.50	mg/kg	456	607	864	12300	370	
lithium	7439-93-2	E440	2.0	mg/kg	29.1	48.2	24.2	20.9	21.0	
magnesium	7439-95-4	E440	20	mg/kg	10900	12500	10200	10800	10200	
manganese	7439-96-5	E440	1.0	mg/kg	779	1050	937	1490	741	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	21.5	33.0	22.9	30.1	20.7	
nickel	7440-02-0	E440	0.50	mg/kg	231	191	158	242	327	
phosphorus	7723-14-0	E440	50	mg/kg	13900	13500	12300	12700	12100	
potassium	7440-09-7	E440	100	mg/kg	4760	5630	4930	4610	4740	
selenium	7782-49-2	E440	0.20	mg/kg	0.72	0.31	0.78	0.48	0.34	
silver	7440-22-4	E440	0.10	mg/kg	7.21	3.99	4.69	5.73	12.4	
sodium	7440-23-5	E440	50	mg/kg	15200	17300	15600	14500	14700	
strontium	7440-24-6	E440	0.50	mg/kg	343	339	276	288	304	
sulfur	7704-34-9	E440	1000	mg/kg	10500	10500	10300	10000	9100	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-1	BA2239-A-2	BA2239-A-3	BA2239-A-4	BA2239-A-5
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-001	VA22C3844-002	VA22C3844-003	VA22C3844-004	VA22C3844-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.073	0.078	0.078	0.129	0.067	
tin	7440-31-5	E440	2.0	mg/kg	110	124	96.2	119	193	
titanium	7440-32-6	E440	1.0	mg/kg	249	248	242	193	183	
tungsten	7440-33-7	E440	0.50	mg/kg	10.9	9.44	8.72	16.2	10.0	
uranium	7440-61-1	E440	0.050	mg/kg	6.44	6.86	6.65	6.53	6.34	
vanadium	7440-62-2	E440	0.20	mg/kg	60.9	67.9	57.7	64.5	60.5	
zinc	7440-66-6	E440	2.0	mg/kg	3060	3650	4470	3720	3020	
zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.6	2.6	2.4	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.2	11.2	11.2	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.14	9.13	8.95	9.07	8.90	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.17	6.29	6.27	6.22	6.04	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.05	2.07	2.15	2.14	2.11	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.150	0.150	0.178	0.151	0.143	
calcium, TCLP	7440-70-2	E444	10	mg/L	1870	1880	1930	1910	1850	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.01	1.42	1.37	1.30	1.10	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.07	1.25	1.18	0.937	0.760	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	125	130	132	132	126	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.69	0.56	0.55	0.68	0.60	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-1	BA2239-A-2	BA2239-A-3	BA2239-A-4	BA2239-A-5
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-001	VA22C3844-002	VA22C3844-003	VA22C3844-004	VA22C3844-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	32.2	27.7	27.8	34.6	37.0	37.0
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-6	BA2239-A-7	BA2239-A-8	BA2239-A-9	BA2239-A-10
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-006	VA22C3844-007	VA22C3844-008	VA22C3844-009	VA22C3844-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.0	22.6	21.9	22.9	22.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.1	10.3	10.2	10.1	10.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	34500	30200	46300	32300	38100	
antimony	7440-36-0	E440	0.10	mg/kg	131	105	138	129	124	
arsenic	7440-38-2	E440	0.10	mg/kg	19.3	20.2	36.5	29.3	29.7	
barium	7440-39-3	E440	0.50	mg/kg	458	566	738	561	540	
beryllium	7440-41-7	E440	0.10	mg/kg	<0.71	0.37	0.45	<0.72	0.43	
bismuth	7440-69-9	E440	0.20	mg/kg	7.65	7.46	7.97	11.5	9.25	
boron	7440-42-8	E440	5.0	mg/kg	164	142	285	207	168	
cadmium	7440-43-9	E440	0.020	mg/kg	11.1	11.5	14.1	18.4	12.4	
calcium	7440-70-2	E440	50	mg/kg	120000	119000	159000	124000	134000	
chromium	7440-47-3	E440	0.50	mg/kg	177	230	219	177	200	
cobalt	7440-48-4	E440	0.10	mg/kg	349	36.7	154	40.3	85.5	
copper	7440-50-8	E440	0.50	mg/kg	25100	2230	15900	26200	2720	
iron	7439-89-6	E440	50	mg/kg	61000	84200	75000	68300	87800	
lead	7439-92-1	E440	0.50	mg/kg	2360	312	1440	3670	1050	
lithium	7439-93-2	E440	2.0	mg/kg	44.3	20.4	28.8	22.8	54.4	
magnesium	7439-95-4	E440	20	mg/kg	10600	10400	14300	10300	11200	
manganese	7439-96-5	E440	1.0	mg/kg	849	972	1390	852	960	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	0.0635	
molybdenum	7439-98-7	E440	0.10	mg/kg	24.4	47.1	32.9	25.0	29.4	
nickel	7440-02-0	E440	0.50	mg/kg	502	572	191	1690	231	
phosphorus	7723-14-0	E440	50	mg/kg	12300	12600	17800	10600	13400	
potassium	7440-09-7	E440	100	mg/kg	4380	4600	6300	4790	5200	
selenium	7782-49-2	E440	0.20	mg/kg	<1.41	0.28	0.48	<1.44	0.38	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	3.85	----	
silver	7440-22-4	E440	0.10	mg/kg	5.06	4.68	6.87	----	6.84	
sodium	7440-23-5	E440	50	mg/kg	13500	13800	18000	14200	16100	
strontium	7440-24-6	E440	0.50	mg/kg	269	286	352	267	326	
sulfur	7704-34-9	E440	1000	mg/kg	8800	9200	13000	9600	11400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-6	BA2239-A-7	BA2239-A-8	BA2239-A-9	BA2239-A-10
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-006	VA22C3844-007	VA22C3844-008	VA22C3844-009	VA22C3844-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	<0.353	0.065	0.101	<0.360	0.075	
tin	7440-31-5	E440	2.0	mg/kg	134	123	177	436	225	
titanium	7440-32-6	E440	1.0	mg/kg	178	176	284	201	190	
tungsten	7440-33-7	E440	0.50	mg/kg	10.3	9.72	14.1	8.54	13.0	
uranium	7440-61-1	E440	0.050	mg/kg	6.37	6.18	8.01	6.32	7.00	
vanadium	7440-62-2	E440	0.20	mg/kg	57.9	61.8	80.1	53.4	69.8	
zinc	7440-66-6	E440	2.0	mg/kg	4740	3840	7820	10500	4230	
zirconium	7440-67-7	E440	1.0	mg/kg	<7.1	2.9	4.0	<7.2	2.9	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.3	11.3	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.09	9.08	8.95	9.03	8.92	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	5.97	6.08	6.24	6.23	6.19	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.02	2.14	2.11	2.23	2.28	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.151	1.60	0.136	0.144	0.147	
calcium, TCLP	7440-70-2	E444	10	mg/L	1870	1900	1900	1970	1970	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.24	1.90	1.81	1.90	0.902	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.693	0.952	0.962	0.973	0.673	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	129	134	134	132	135	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.68	0.59	0.58	0.56	0.58	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-6	BA2239-A-7	BA2239-A-8	BA2239-A-9	BA2239-A-10
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00	28-Sep-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-006	VA22C3844-007	VA22C3844-008	VA22C3844-009	VA22C3844-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	31.3	31.1	24.2	25.2	29.5	29.5
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2239-A-11	BA2239-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	28-Sep-2022 09:00	28-Sep-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-011	VA22C3844-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	21.8	22.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.3	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	29200	28800	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	135	121	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	22.1	28.7	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	584	465	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.44	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	5.49	7.34	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	180	153	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	13.5	12.0	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	128000	136000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	136	353	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	554	41.3	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2830	2640	----	----	----	
iron	7439-89-6	E440	50	mg/kg	69700	89800	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	435	1810	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	26.4	20.8	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	10800	11400	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	810	899	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	23.8	38.7	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	145	186	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	13100	13100	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5190	5270	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.63	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	8.59	5.44	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	15700	15000	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	295	317	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	10200	12500	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.070	0.083	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-11	BA2239-A-12	----	----	----
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-011 Result	VA22C3844-012 Result	-----	-----	-----	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	231	354	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	191	201	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	40.4	8.79	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	6.35	6.94	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	61.7	67.4	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	3380	3520	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	2.5	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.06	9.00	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.17	6.22	----	----	----	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	----	----	----	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.17	2.16	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.148	0.232	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	1980	1970	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.03	1.60	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.655	0.952	----	----	----	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	134	133	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.67	0.65	----	----	----	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	----	----	----	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	----	----	----	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2239-A-11	BA2239-A-12	----	----	----
Client sampling date / time					28-Sep-2022 09:00	28-Sep-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22C3844-011	VA22C3844-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	32.1	24.4	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22C3844	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Nicole Victor	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 04-Oct-2022 13:10
PO	: VANCO 0000051213	Issue Date	: 14-Oct-2022 16:56
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22C3844-001	BA2239-A-1	beryllium	7440-41-7	E440	0.26 % ^{DUP-H}	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA22C3844-001	BA2239-A-1	cobalt	7440-48-4	E440	105 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C3844-001	BA2239-A-1	lead	7439-92-1	E440	91.5 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22C3844-001	BA2239-A-1	zinc	7440-66-6	E440	44.3 % ^{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 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 : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2239-A-9	E440.Ag	28-Sep-2022	13-Oct-2022	180 days	15 days	✓	13-Oct-2022	165 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-1	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-10	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-11	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-12	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-2	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-3	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✓	



Matrix: Soil/Solid

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

Analyte Group 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 BA2239-A-4	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-5	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-6	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-7	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-8	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2239-A-9	E510	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	28 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2239-A-1	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2239-A-10	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2239-A-11	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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 ICPCS											
LDPE bag BA2239-A-12	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-2	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-3	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-4	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-5	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-6	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-7	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-8	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2239-A-9	E440	28-Sep-2022	09-Oct-2022	----	----		10-Oct-2022	180 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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 BA2239-A-1	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-10	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-11	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-12	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-2	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-3	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-4	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-5	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2239-A-6	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----	



Matrix: Soil/Solid

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

Analyte Group 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 BA2239-A-7	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2239-A-8	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2239-A-9	E144	28-Sep-2022	----	----	----		08-Oct-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-1	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-10	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-11	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-12	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-2	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-3	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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 BA2239-A-4	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-5	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-6	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-7	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-8	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2239-A-9	E108	28-Sep-2022	09-Oct-2022	----	----		11-Oct-2022	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-1	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-10	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-11	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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) BA2239-A-12	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-2	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-3	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-4	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-5	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-6	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-7	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-8	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2239-A-9	E512	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	28 days	15 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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) BA2239-A-1	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-10	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-11	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-12	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-2	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-3	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-4	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-5	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-6	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	



Matrix: Soil/Solid

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

Analyte Group 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) BA2239-A-7	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-8	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2239-A-9	E444	05-Oct-2022	13-Oct-2022	----	----		13-Oct-2022	180 days	15 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-1	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-10	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-11	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-12	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-2	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-3	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----		



Matrix: **Soil/Solid**

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

Analyte Group 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) BA2239-A-4	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-5	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-6	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-7	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-8	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2239-A-9	EPP444	28-Sep-2022	05-Oct-2022	----	----		----	----	----	

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 (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	687141	1	20	5.0	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	687142	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	687144	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	687143	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	694223	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	687141	2	20	10.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	687142	2	20	10.0	10.0	✔
Moisture Content by Gravimetry	E144	687144	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	687143	1	20	5.0	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	694223	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	694661	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	687141	1	20	5.0	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	694662	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	687142	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	687144	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	694661	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	694662	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 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °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 Vancouver - Environmental	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 Vancouver - Environmental	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.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are 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. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	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 Vancouver - Environmental	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 Vancouver - Environmental	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



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	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.
Digestion for Silver	EP440.Ag Vancouver - Environmental	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 Vancouver - Environmental	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 : VA22C3844
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 : VANCO 0000051213
C-O-C number : ---
Sampler : ---
Site : ---
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 04-Oct-2022 13:10
Date Analysis Commenced : 05-Oct-2022
Issue Date : 14-Oct-2022 16:42

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.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Janice Leung (Supervisor - Organics Instrumentation), Kim Jensen (Department Manager - Metals), and Qammar Almas (Lab Assistant).

Page : 2 of 11
Work Order : VA22C3844
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



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: 687143)											
VA22C3844-001	BA2239-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.2	1.0%	5%	----
Physical Tests (QC Lot: 687144)											
VA22C3844-001	BA2239-A-1	moisture	----	E144	0.25	%	21.7	21.3	1.62%	20%	----
Metals (QC Lot: 687141)											
VA22C3844-001	BA2239-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 687142)											
VA22C3844-001	BA2239-A-1	aluminum	7429-90-5	E440	50	mg/kg	44800	38300	15.5%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	108	125	14.0%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	22.4	23.5	4.88%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	561	553	1.41%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.36	# 0.62	0.26	Diff <2x LOR	DUP-H
		bismuth	7440-69-9	E440	0.20	mg/kg	6.67	6.45	3.33%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	171	174	1.66%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	12.8	12.5	2.48%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	127000	136000	6.40%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	184	179	2.87%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	162	50.2	105%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	4830	6330	26.9%	30%	----
		iron	7439-89-6	E440	50	mg/kg	60600	62200	2.50%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	456	1220	91.5%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	29.1	27.1	7.25%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	10900	11500	5.18%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	779	984	23.3%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	21.5	25.1	15.4%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	231	198	15.7%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	13900	13000	7.31%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4760	5110	7.01%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.72	0.40	0.32	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	7.21	6.52	10.1%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	15200	15200	0.287%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	343	327	4.80%	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: 687142) - continued											
VA22C3844-001	BA2239-A-1	sulfur	7704-34-9	E440	1000	mg/kg	10500	10800	2.35%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.073	0.077	0.004	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	110	115	4.31%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	249	234	6.46%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	10.9	14.5	28.7%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	6.44	7.10	9.84%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	60.9	70.1	14.0%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3060	4800	44.3%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.1	0.5	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: 687144)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 687141)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 687142)						
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 687142) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 694223)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 694661)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 694662)						
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				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 687143)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 687144)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Metals (QCLot: 687141)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 687142)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.9	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	113	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	103	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	90.8	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	85.6	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	102	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	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	101	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	109	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	100	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	88.0	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	97.8	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	101	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	91.2	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	113	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
Metals (QCLot: 687142) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	93.6	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	105	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	106	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	97.4	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	100	80.0	120	----
Metals (QCLot: 694223)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	87.8	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 $\geq 1x$ spike level.

Sub-Matrix: Soil/Solid

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
TCLP Metals (QCLot: 694661)										
VA22C3844-001	BA2239-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.7	50.0	140	----
TCLP Metals (QCLot: 694662)										
VA22C3844-001	BA2239-A-1	antimony, TCLP	7440-36-0	E444	4.80 mg/L	5 mg/L	95.9	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.5 mg/L	5 mg/L	90.8	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.1 mg/L	12.5 mg/L	88.7	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.245 mg/L	0.25 mg/L	97.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.08 mg/L	10 mg/L	90.8	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.230 mg/L	0.25 mg/L	92.1	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	1.10 mg/L	1.25 mg/L	88.1	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	2.11 mg/L	2.5 mg/L	84.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	224 mg/L	250 mg/L	89.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.28 mg/L	10 mg/L	92.8	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	228 mg/L	250 mg/L	91.4	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.14 mg/L	2.5 mg/L	85.4	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.72 mg/L	5 mg/L	94.4	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.096 mg/L	0.1 mg/L	96.4	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	93.6	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.76 mg/L	5 mg/L	95.1	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.68 mg/L	0.75 mg/L	90.8	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	8 mg/L	10 mg/L	83.1	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: 687141)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	109	70.0	130	---
Metals (QCLot: 687142)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	102	70.0	130	---
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	101	70.0	130	---
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	99.6	70.0	130	---
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	---
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	102	70.0	130	---
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	114	40.0	160	---
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	96.1	70.0	130	---
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	---
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	111	70.0	130	---
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	---
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	101	70.0	130	---
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	99.6	70.0	130	---
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	103	70.0	130	---
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	108	70.0	130	---
	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	101	70.0	130	---
	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	104	70.0	130	---
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	---
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	---
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	94.9	70.0	130	---
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	110	70.0	130	---
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	103	70.0	130	---
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	105	70.0	130	---
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	107	40.0	160	---
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	97.9	70.0	130	---
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	103	70.0	130	---
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	105	70.0	130	---
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	108	70.0	130	---

Page : 11 of 11
 Work Order : VA22C3844
 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: 687142) - continued									
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	92.2	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	96.5	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: Steve McKinney / 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: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Burnaby BC			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Phone: 604-521-1025			Email 3: dskrypnik@covanta.com			Analysis Request					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			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 #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td colspan="6"></td> <td rowspan="4">Number of Containers</td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)							Number of Containers																		
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:			Fax:																																					

Lab Work Order # (lab use only)		ALS Contact:	Sampler:									
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)				Number of Containers
BA2239-A-1		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-2		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-3		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-4		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-5		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-6		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-7		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-8		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-9		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-10		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-11		28-Sep-22	9:00	Soil	X	X		X				1
BA2239-A-12		28-Sep-22	9:00	Soil	X	X		X				1

Environmental Division
 Vancouver
 Work Order Reference
VA22C3844

Telephone: +1 604 253 4188

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)				SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF	
<i>[Signature]</i>	4 Oct 22	800	JE	4 Oct 22	13:10	21 °C					