

Bottom Ash Data

2022 Week 3

The following analytical report represents bottom ash composite results for week 3 of 2022 (January 16, 2022 to January 22, 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 : **VA22A1388**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
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 : 25-Jan-2022 09:55
Date Analysis Commenced : 29-Jan-2022
Issue Date : 02-Feb-2022 16:01

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>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2203-A-1	BA2203-A-2	BA2203-A-3	BA2203-A-4	BA2203-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-001	VA22A1388-002	VA22A1388-003	VA22A1388-004	VA22A1388-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	24.1	25.8	24.4	24.4	23.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.1	10.1	10.4	10.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	38500	37600	32300	42400	34100	
antimony	7440-36-0	E440	0.10	mg/kg	127	118	190	109	127	
arsenic	7440-38-2	E440	0.10	mg/kg	15.4	18.6	47.0	17.9	19.2	
barium	7440-39-3	E440	0.50	mg/kg	763	772	656	668	658	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.41	0.42	0.43	0.39	
bismuth	7440-69-9	E440	0.20	mg/kg	6.76	9.34	8.04	9.28	7.94	
boron	7440-42-8	E440	5.0	mg/kg	238	279	215	247	193	
cadmium	7440-43-9	E440	0.020	mg/kg	9.39	9.85	11.6	9.06	9.45	
calcium	7440-70-2	E440	50	mg/kg	133000	153000	143000	142000	146000	
chromium	7440-47-3	E440	0.50	mg/kg	126	157	189	167	186	
cobalt	7440-48-4	E440	0.10	mg/kg	48.8	131	50.4	35.7	134	
copper	7440-50-8	E440	0.50	mg/kg	1750	2400	3340	1820	2180	
iron	7439-89-6	E440	50	mg/kg	63100	72400	70000	68000	65100	
lead	7439-92-1	E440	0.50	mg/kg	1140	332	4050	930	421	
lithium	7439-93-2	E440	2.0	mg/kg	29.5	26.6	23.3	26.5	30.5	
magnesium	7439-95-4	E440	20	mg/kg	14500	15100	13700	13700	14900	
manganese	7439-96-5	E440	1.0	mg/kg	802	1130	901	986	896	
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	20.3	28.5	32.7	24.9	26.5	
nickel	7440-02-0	E440	0.50	mg/kg	143	222	163	116	249	
phosphorus	7723-14-0	E440	50	mg/kg	11300	14700	14700	12700	14300	
potassium	7440-09-7	E440	100	mg/kg	5490	5740	5750	5800	5780	
selenium	7782-49-2	E440	0.20	mg/kg	0.30	0.36	0.40	0.28	0.31	
silver	7440-22-4	E440	0.10	mg/kg	7.77	12.2	7.69	9.70	7.66	
sodium	7440-23-5	E440	50	mg/kg	16500	18000	17400	18200	17300	
strontium	7440-24-6	E440	0.50	mg/kg	367	389	379	371	382	
sulfur	7704-34-9	E440	1000	mg/kg	12500	13900	13700	12900	12500	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2203-A-1	BA2203-A-2	BA2203-A-3	BA2203-A-4	BA2203-A-5
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-001	VA22A1388-002	VA22A1388-003	VA22A1388-004	VA22A1388-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.078	0.081	0.079	0.063	0.072	
tin	7440-31-5	E440	2.0	mg/kg	101	181	150	248	123	
titanium	7440-32-6	E440	1.0	mg/kg	673	692	441	839	456	
tungsten	7440-33-7	E440	0.50	mg/kg	28.3	31.5	35.3	29.1	26.0	
uranium	7440-61-1	E440	0.050	mg/kg	6.29	7.08	7.14	6.44	6.66	
vanadium	7440-62-2	E440	0.20	mg/kg	47.2	53.4	49.1	49.7	50.8	
zinc	7440-66-6	E440	2.0	mg/kg	7980	5250	5280	3650	3470	
zirconium	7440-67-7	E440	1.0	mg/kg	2.1	2.5	2.9	4.1	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.4	11.4	11.4	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.23	9.29	8.98	9.21	9.11	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444	0.010	pH units	6.40	6.53	6.55	6.15	6.49	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
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	1.81	1.82	2.04	1.89	1.94	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.093	0.093	1.94	0.116	0.134	
calcium, TCLP	7440-70-2	E444	10	mg/L	1860	1880	1920	1920	1800	
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	0.911	0.764	0.798	1.43	1.66	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.974	0.972	0.744	0.871	0.812	
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	132	144	139	146	144	
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	0.47	0.42	0.72	0.52	0.41	
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	BA2203-A-1	BA2203-A-2	BA2203-A-3	BA2203-A-4	BA2203-A-5
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-001	VA22A1388-002	VA22A1388-003	VA22A1388-004	VA22A1388-005	
					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	16.0	19.9	18.4	28.0	19.4	19.4
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	BA2203-A-6	BA2203-A-7	BA2203-A-8	BA2203-A-9	BA2203-A-10
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-006	VA22A1388-007	VA22A1388-008	VA22A1388-009	VA22A1388-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	23.8	24.9	24.6	23.9	26.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.2	10.2	10.6	10.2	10.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39500	40700	36000	37700	40500	
antimony	7440-36-0	E440	0.10	mg/kg	131	130	104	110	127	
arsenic	7440-38-2	E440	0.10	mg/kg	16.8	22.5	13.1	15.6	16.4	
barium	7440-39-3	E440	0.50	mg/kg	569	740	738	747	760	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.45	0.43	0.39	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	7.36	9.14	6.14	8.36	6.99	
boron	7440-42-8	E440	5.0	mg/kg	211	263	204	192	234	
cadmium	7440-43-9	E440	0.020	mg/kg	12.5	11.7	8.56	9.71	9.61	
calcium	7440-70-2	E440	50	mg/kg	145000	143000	137000	140000	137000	
chromium	7440-47-3	E440	0.50	mg/kg	134	173	120	184	196	
cobalt	7440-48-4	E440	0.10	mg/kg	56.7	110	54.6	39.9	115	
copper	7440-50-8	E440	0.50	mg/kg	1950	2590	2080	4580	2840	
iron	7439-89-6	E440	50	mg/kg	49000	68000	50500	53600	65500	
lead	7439-92-1	E440	0.50	mg/kg	394	1360	349	342	878	
lithium	7439-93-2	E440	2.0	mg/kg	25.1	29.9	20.6	23.6	29.3	
magnesium	7439-95-4	E440	20	mg/kg	13600	14600	13600	13800	14900	
manganese	7439-96-5	E440	1.0	mg/kg	927	1920	778	1060	862	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.0513	0.0580	
molybdenum	7439-98-7	E440	0.10	mg/kg	20.2	25.9	21.2	23.1	27.9	
nickel	7440-02-0	E440	0.50	mg/kg	104	130	158	281	142	
phosphorus	7723-14-0	E440	50	mg/kg	14600	14800	14200	14400	13400	
potassium	7440-09-7	E440	100	mg/kg	5600	5960	5380	5130	5470	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.34	0.33	0.29	0.36	
silver	7440-22-4	E440	0.10	mg/kg	6.47	6.77	6.99	7.09	10.6	
sodium	7440-23-5	E440	50	mg/kg	18100	17600	17200	15900	16600	
strontium	7440-24-6	E440	0.50	mg/kg	378	517	382	526	599	
sulfur	7704-34-9	E440	1000	mg/kg	15500	13200	11800	11600	12200	
thallium	7440-28-0	E440	0.050	mg/kg	0.065	0.075	0.060	0.063	0.072	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2203-A-6	BA2203-A-7	BA2203-A-8	BA2203-A-9	BA2203-A-10
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-006	VA22A1388-007	VA22A1388-008	VA22A1388-009	VA22A1388-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	114	124	93.3	155	376	
titanium	7440-32-6	E440	1.0	mg/kg	448	410	322	352	748	
tungsten	7440-33-7	E440	0.50	mg/kg	29.5	25.7	22.7	21.8	30.0	
uranium	7440-61-1	E440	0.050	mg/kg	6.70	7.14	5.87	6.32	6.48	
vanadium	7440-62-2	E440	0.20	mg/kg	48.9	59.0	44.3	45.9	47.2	
zinc	7440-66-6	E440	2.0	mg/kg	5270	3630	3510	3470	7690	
zirconium	7440-67-7	E440	1.0	mg/kg	3.3	3.1	3.4	2.9	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.6	11.6	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.01	9.16	9.31	9.47	9.17	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444	0.010	pH units	6.42	6.19	6.30	6.15	6.18	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
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	1.88	1.95	1.94	2.02	1.90	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.098	0.123	0.111	0.164	0.164	
calcium, TCLP	7440-70-2	E444	10	mg/L	1750	1900	1880	2020	1930	
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	1.12	1.30	0.854	1.41	0.789	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.960	1.32	1.06	0.963	0.951	
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	132	146	153	150	147	
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	0.46	0.53	0.43	0.90	0.44	
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	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2203-A-6	BA2203-A-7	BA2203-A-8	BA2203-A-9	BA2203-A-10
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00	19-Jan-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-006	VA22A1388-007	VA22A1388-008	VA22A1388-009	VA22A1388-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
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	18.2	30.8	22.0	24.1	41.5	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<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	BA2203-A-11	BA2203-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	19-Jan-2022 09:00	19-Jan-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-011	VA22A1388-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	24.9	25.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.2	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	37200	43900	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	151	113	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	15.4	14.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	822	609	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.48	0.38	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	17.3	6.28	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	260	154	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	9.14	8.22	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	161000	132000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	142	173	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	42.9	42.1	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1800	1410	----	----	----	
iron	7439-89-6	E440	50	mg/kg	55100	79600	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	334	421	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	24.9	23.6	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	15300	13000	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1070	1030	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	21.7	23.9	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	122	130	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	15400	13000	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5380	5140	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.31	0.29	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	10.3	7.48	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	17200	16500	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	405	341	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	13400	11600	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.064	0.062	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2203-A-11	BA2203-A-12	----	----	----
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-011	VA22A1388-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	113	138	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	701	699	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	23.0	30.1	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	6.75	5.97	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	49.8	45.3	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	3650	2800	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.6	3.2	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.23	8.98	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.26	6.25	---	---	---	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
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	2.02	2.14	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.159	0.116	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	1900	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.688	1.15	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.935	1.22	---	---	---	
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	151	147	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.43	0.49	---	---	---	
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	BA2203-A-11	BA2203-A-12	----	----	----
Client sampling date / time					19-Jan-2022 09:00	19-Jan-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A1388-011	VA22A1388-012	-----	-----	-----	
					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	22.8	28.7	----	----	----	
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	: VA22A1388	Page	: 1 of 15
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 25-Jan-2022 09:55
PO	: VANCO 0000051213	Issue Date	: 02-Feb-2022 16:01
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 Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

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	VA22A1388-001	BA2203-A-1	chromium	7440-47-3	E440	41.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	cobalt	7440-48-4	E440	81.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	iron	7439-89-6	E440	39.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	lead	7439-92-1	E440	107 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	silver	7440-22-4	E440	93.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	tungsten	7440-33-7	E440	123 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A1388-001	BA2203-A-1	zinc	7440-66-6	E440	79.7 % 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 : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-1	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-10	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-11	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-12	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-2	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-3	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-4	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-5	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-6	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-7	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-8	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2203-A-9	E510	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	28 days	13 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2203-A-1	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2203-A-10	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2203-A-11	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2203-A-12	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 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		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-2	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-3	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-4	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-5	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-6	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-7	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-8	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2203-A-9	E440	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	180 days	13 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2203-A-1	E144	19-Jan-2022	----	----	----		29-Jan-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 BA2203-A-10	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-11	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-12	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-2	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-3	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-4	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-5	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-6	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2203-A-7	E144	19-Jan-2022	----	----	----		29-Jan-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 BA2203-A-8	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2203-A-9	E144	19-Jan-2022	----	----	----		29-Jan-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-1	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-10	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-11	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-12	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-2	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-3	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-4	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-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 BA2203-A-5	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-6	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-7	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-8	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2203-A-9	E108	19-Jan-2022	01-Feb-2022	----	----		01-Feb-2022	30 days	13 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2203-A-1	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2203-A-10	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2203-A-11	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2203-A-12	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	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	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-2	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-3	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-4	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-5	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-6	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-7	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-8	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2203-A-9	E512	30-Jan-2022	----	----	----		01-Feb-2022	----	13 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2203-A-1	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 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		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-10	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-11	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-12	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-2	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-3	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-4	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-5	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-6	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2203-A-7	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 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	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2203-A-8	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2203-A-9	E444	30-Jan-2022	----	----	----		01-Feb-2022	180 days	13 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-1	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-10	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-11	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-12	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-2	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-3	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-4	EPP444	19-Jan-2022	30-Jan-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: 180 Day HT (e.g. metals ex. Hg) BA2203-A-5	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-6	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-7	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-8	EPP444	19-Jan-2022	30-Jan-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2203-A-9	EPP444	19-Jan-2022	30-Jan-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	397754	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	397753	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	397757	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	397756	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	397754	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	397753	2	16	12.5	10.0	✔
Moisture Content by Gravimetry	E144	397757	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	397756	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	399498	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	397754	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	399499	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	397753	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	397757	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	399498	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	399499	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 $20 \pm 5^\circ\text{C}$), 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 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. Elemental Sulfur may be poorly recovered by this method. 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
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 $<60^\circ\text{C}$) 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.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 : VA22A1388

Page : 1 of 11

Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
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

Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 25-Jan-2022 09:55
Date Analysis Commenced : 29-Jan-2022
Issue Date : 02-Feb-2022 16:01

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 Percentage Difference (RPD) and Acceptance Limits
Matrix Spike (MS) Report; Recovery and Acceptance Limits
Reference Material (RM) Report; Recovery and Acceptance Limits
Method Blank (MB) Report; Recovery and Acceptance Limits
Laboratory Control Sample (LCS) Report; Recovery and Acceptance Limits

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 Caleb Deroche (Lab Analyst), Dee Lee (Analyst), Kevin Duarte (Supervisor - Metals ICP Instrumentation), Rebecca Sit (Supervisor - Organics Extractions), and Robin Weeks (Team Leader - Metals).

Page : 2 of 11
Work Order : VA22A1388
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 Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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



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: 397756)											
VA22A1388-001	BA2203-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.1	1.5%	5%	----
Physical Tests (QC Lot: 397757)											
VA22A1388-001	BA2203-A-1	moisture	----	E144	0.25	%	24.1	24.6	2.14%	20%	----
Metals (QC Lot: 397753)											
VA22A1388-001	BA2203-A-1	aluminum	7429-90-5	E440	50	mg/kg	38500	39200	1.98%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	127	112	12.2%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	15.4	19.6	23.9%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	763	686	10.6%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.42	0.004	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	6.76	7.53	10.7%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	238	221	7.44%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	9.39	9.73	3.59%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	133000	152000	13.3%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	126	191	41.0%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	48.8	116	81.5%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	1750	2110	18.9%	30%	----
		iron	7439-89-6	E440	50	mg/kg	63100	42400	39.2%	30%	DUP-H
		lead	7439-92-1	E440	0.50	mg/kg	1140	347	107%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	29.5	25.9	13.0%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	14500	14500	0.157%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	802	646	21.6%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	20.3	28.8	34.8%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	143	143	0.387%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11300	14700	26.0%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5490	5700	3.79%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.30	0.33	0.03	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	7.77	21.4	93.6%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	16500	17200	4.08%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	367	378	2.97%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	12500	12400	0.377%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.078	0.073	0.005	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: 397753) - continued											
VA22A1388-001	BA2203-A-1	tin	7440-31-5	E440	2.0	mg/kg	101	103	1.58%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	673	482	33.1%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	28.3	120	123%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	6.29	7.05	11.5%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	47.2	48.7	3.20%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	7980	3430	79.7%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	2.1	3.7	1.6	Diff <2x LOR	----
Metals (QC Lot: 397754)											
VA22A1388-001	BA2203-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0622	0.0122	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: 397757)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 397753)						
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	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 397753) - continued						
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: 397754)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 399498)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 399499)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
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: 397756)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.5	95.0	105	---
Physical Tests (QCLot: 397757)									
moisture	---	E144	0.25	%	50 %	100	90.0	110	---
Metals (QCLot: 397753)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	113	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	103	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	108	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	106	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	103	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	103	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	110	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	106	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	110	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	100	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	103	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.3	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	113	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	110	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	113	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.0	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: 397753) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	110	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	120	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	107	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	97.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	108	80.0	120	----
Metals (QCLot: 397754)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.7	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: 399498)										
VA22A1388-001	BA2203-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	101	50.0	140	----
TCLP Metals (QCLot: 399499)										
VA22A1388-001	BA2203-A-1	antimony, TCLP	7440-36-0	E444	5.8 mg/L	5 mg/L	116	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.5 mg/L	5 mg/L	109	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.3 mg/L	12.5 mg/L	106	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.253 mg/L	0.25 mg/L	101	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.5 mg/L	10 mg/L	105	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.269 mg/L	0.25 mg/L	108	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	1.37 mg/L	1.25 mg/L	109	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	2.61 mg/L	2.5 mg/L	104	50.0	140	----
		iron, TCLP	7439-89-6	E444	278 mg/L	250 mg/L	111	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.9 mg/L	10 mg/L	109	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	274 mg/L	250 mg/L	110	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.61 mg/L	2.5 mg/L	104	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.33 mg/L	5 mg/L	107	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.121 mg/L	0.1 mg/L	121	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.2 mg/L	5 mg/L	103	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.37 mg/L	5 mg/L	107	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.84 mg/L	0.75 mg/L	112	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	10 mg/L	10 mg/L	100.0	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

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: 397753)									
QC-397753-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	111	70.0	130	----
QC-397753-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	112	70.0	130	----
QC-397753-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	120	70.0	130	----
QC-397753-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	116	70.0	130	----
QC-397753-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	116	70.0	130	----
QC-397753-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	134	40.0	160	----
QC-397753-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	109	70.0	130	----
QC-397753-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	111	70.0	130	----
QC-397753-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	118	70.0	130	----
QC-397753-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	112	70.0	130	----
QC-397753-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	114	70.0	130	----
QC-397753-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	111	70.0	130	----
QC-397753-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	114	70.0	130	----
QC-397753-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	113	70.0	130	----
QC-397753-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	116	70.0	130	----
QC-397753-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	120	70.0	130	----
QC-397753-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	117	70.0	130	----
QC-397753-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	114	70.0	130	----
QC-397753-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	114	70.0	130	----
QC-397753-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	120	70.0	130	----
QC-397753-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	127	70.0	130	----
QC-397753-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	116	70.0	130	----
QC-397753-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	109	40.0	160	----
QC-397753-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	109	70.0	130	----
QC-397753-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
QC-397753-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	123	70.0	130	----
QC-397753-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	117	70.0	130	----
QC-397753-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
QC-397753-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	111	70.0	130	----

Page : 11 of 11
 Work Order : VA22A1388
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

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: 397754)									
QC-397754-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	97.0	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			
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		Analysis Request						Number of Containers								
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		Job #:		Please indicate below Filtered, Preserved or both (F, P, F/P)														
Company:		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite		MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrom 6	MET-CSR+FULL-VA (all metals)											
Contact:		LSD: (includes 2:1 pH)																
Address:		Quote #:																
Phone:																		

Lab Work Order # (lab use only) 1388		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	Chrom 6	MET-CSR+FULL-VA (all metals)				Number of Containers
BA2203-A-1	<p align="center">Environmental Division Vancouver Work Order Reference VA22A1388</p> <p align="center">Telephone : + 1 604 253 4188</p>	19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-2		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-3		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-4		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-5		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-6		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-7		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-8		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-9		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-10		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-11		19-Jan-22	9:00	Soil	X	X		X				1
BA2203-A-12		19-Jan-22	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): 25-Jan-22	Time (hh-mm): 0800	Received by: JC	Date: 25 Jan 2022	Time: 955am	Temperature: 24,24 °C	Verified by:	Date:	Time:	Observations:	
											Yes / No ?
											If Yes add SIF