

Bottom Ash Data

2022 Week 10

The following analytical report represents bottom ash composite results for week 10 of 2022 (March 6, 2022 to March 12, 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 : **VA22A5283**
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 : 15-Mar-2022 10:40
Date Analysis Commenced : 23-Mar-2022
Issue Date : 31-Mar-2022 10:24

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>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Organics, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2210-A-1	BA2210-A-2	BA2210-A-3	BA2210-A-4	BA2210-A-5
(Matrix: Soil/Solid)					Client sampling date / time	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-001	VA22A5283-002	VA22A5283-003	VA22A5283-004	VA22A5283-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	22.7	22.3	22.0	21.7	22.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.5	10.6	10.4	10.9	10.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	42300	55400	32400	33000	63000	
antimony	7440-36-0	E440	0.10	mg/kg	100	120	100	119	104	
arsenic	7440-38-2	E440	0.10	mg/kg	17.0	20.3	17.1	16.8	17.0	
barium	7440-39-3	E440	0.50	mg/kg	578	554	478	539	555	
beryllium	7440-41-7	E440	0.10	mg/kg	0.47	0.42	0.37	0.43	0.45	
bismuth	7440-69-9	E440	0.20	mg/kg	8.46	10.0	8.05	38.6	8.59	
boron	7440-42-8	E440	5.0	mg/kg	188	153	152	181	171	
cadmium	7440-43-9	E440	0.020	mg/kg	8.42	15.8	8.29	8.06	8.89	
calcium	7440-70-2	E440	50	mg/kg	145000	147000	138000	142000	140000	
chromium	7440-47-3	E440	0.50	mg/kg	150	153	436	151	644	
cobalt	7440-48-4	E440	0.10	mg/kg	59.8	108	65.0	2080	106	
copper	7440-50-8	E440	0.50	mg/kg	2860	1330	1570	21000	7100	
iron	7439-89-6	E440	50	mg/kg	65500	67800	88000	61600	61300	
lead	7439-92-1	E440	0.50	mg/kg	334	511	483	338	368	
lithium	7439-93-2	E440	2.0	mg/kg	38.0	45.8	29.0	48.5	42.4	
magnesium	7439-95-4	E440	20	mg/kg	13400	14700	12300	13200	11500	
manganese	7439-96-5	E440	1.0	mg/kg	786	2100	990	1290	1650	
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	33.9	42.5	92.7	34.2	37.4	
nickel	7440-02-0	E440	0.50	mg/kg	162	140	385	160	496	
phosphorus	7723-14-0	E440	50	mg/kg	11700	13000	10800	12000	12200	
potassium	7440-09-7	E440	100	mg/kg	5800	5820	5150	4760	5560	
selenium	7782-49-2	E440	0.20	mg/kg	0.35	0.32	0.29	0.31	0.31	
silver	7440-22-4	E440	0.10	mg/kg	5.95	5.59	17.7	5.42	5.17	
sodium	7440-23-5	E440	50	mg/kg	18300	19000	16000	15900	16900	
strontium	7440-24-6	E440	0.50	mg/kg	316	324	306	330	339	
sulfur	7704-34-9	E440	1000	mg/kg	13500	14000	12000	11200	13800	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2210-A-1	BA2210-A-2	BA2210-A-3	BA2210-A-4	BA2210-A-5
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-001	VA22A5283-002	VA22A5283-003	VA22A5283-004	VA22A5283-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.058	<0.050	<0.050	0.069	
tin	7440-31-5	E440	2.0	mg/kg	96.2	116	250	96.7	173	
titanium	7440-32-6	E440	1.0	mg/kg	711	423	204	208	434	
tungsten	7440-33-7	E440	0.50	mg/kg	21.4	29.9	18.0	27.3	23.2	
uranium	7440-61-1	E440	0.050	mg/kg	5.49	5.91	5.13	5.26	5.53	
vanadium	7440-62-2	E440	0.20	mg/kg	52.8	55.1	47.3	51.7	55.8	
zinc	7440-66-6	E440	2.0	mg/kg	3830	4100	4360	3960	9060	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	3.8	3.1	1.7	3.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.3	11.5	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.56	8.50	8.45	8.82	8.96	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.26	6.25	6.31	6.12	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	1.82	1.95	1.94	1.89	1.89	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.121	0.143	0.126	0.169	0.165	
calcium, TCLP	7440-70-2	E444	10	mg/L	2190	2300	2280	2140	2240	
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	1.11	0.880	1.59	1.05	0.742	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.782	0.702	1.27	1.15	0.917	
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	137	139	140	139	140	
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	0.43	0.59	0.56	0.76	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	BA2210-A-1	BA2210-A-2	BA2210-A-3	BA2210-A-4	BA2210-A-5
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-001	VA22A5283-002	VA22A5283-003	VA22A5283-004	VA22A5283-005	
					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	27.2	30.5	29.8	30.3	28.0	28.0
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	BA2210-A-6	BA2210-A-7	BA2210-A-8	BA2210-A-9	BA2210-A-10
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-006	VA22A5283-007	VA22A5283-008	VA22A5283-009	VA22A5283-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.2	22.5	22.2	19.9	22.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	10.6	10.6	10.9	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	38500	44900	38700	39300	52300	
antimony	7440-36-0	E440	0.10	mg/kg	108	101	102	120	107	
arsenic	7440-38-2	E440	0.10	mg/kg	18.2	16.9	18.5	20.5	16.8	
barium	7440-39-3	E440	0.50	mg/kg	510	619	534	473	561	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.77	1.49	0.48	0.46	
bismuth	7440-69-9	E440	0.20	mg/kg	8.75	8.02	11.0	11.3	9.80	
boron	7440-42-8	E440	5.0	mg/kg	165	146	186	265	226	
cadmium	7440-43-9	E440	0.020	mg/kg	10.2	8.19	13.1	18.1	9.27	
calcium	7440-70-2	E440	50	mg/kg	141000	135000	154000	164000	144000	
chromium	7440-47-3	E440	0.50	mg/kg	189	155	184	227	207	
cobalt	7440-48-4	E440	0.10	mg/kg	75.4	46.1	156	182	102	
copper	7440-50-8	E440	0.50	mg/kg	8030	7720	4960	3860	3480	
iron	7439-89-6	E440	50	mg/kg	69900	84400	72800	60300	75300	
lead	7439-92-1	E440	0.50	mg/kg	467	319	432	391	374	
lithium	7439-93-2	E440	2.0	mg/kg	42.5	40.1	40.8	64.6	34.3	
magnesium	7439-95-4	E440	20	mg/kg	12900	12600	15200	13900	12200	
manganese	7439-96-5	E440	1.0	mg/kg	907	1520	885	1130	987	
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	37.0	47.9	35.6	39.7	31.9	
nickel	7440-02-0	E440	0.50	mg/kg	162	155	184	376	105	
phosphorus	7723-14-0	E440	50	mg/kg	11400	12000	15900	14500	10400	
potassium	7440-09-7	E440	100	mg/kg	5420	5260	5630	6150	5440	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.39	0.32	0.33	0.31	
silver	7440-22-4	E440	0.10	mg/kg	6.87	8.83	6.31	16.9	6.21	
sodium	7440-23-5	E440	50	mg/kg	17200	16400	18500	19100	18000	
strontium	7440-24-6	E440	0.50	mg/kg	515	328	334	380	398	
sulfur	7704-34-9	E440	1000	mg/kg	13600	12200	14300	15000	12900	
thallium	7440-28-0	E440	0.050	mg/kg	0.057	<0.050	0.060	0.054	0.058	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2210-A-6	BA2210-A-7	BA2210-A-8	BA2210-A-9	BA2210-A-10
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-006	VA22A5283-007	VA22A5283-008	VA22A5283-009	VA22A5283-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	105	88.6	103	180	243	
titanium	7440-32-6	E440	1.0	mg/kg	264	321	240	237	422	
tungsten	7440-33-7	E440	0.50	mg/kg	45.0	23.1	28.5	27.3	29.5	
uranium	7440-61-1	E440	0.050	mg/kg	5.81	5.46	7.11	6.60	5.73	
vanadium	7440-62-2	E440	0.20	mg/kg	57.9	55.1	76.7	60.7	58.0	
zinc	7440-66-6	E440	2.0	mg/kg	5180	4160	6510	5030	6520	
zirconium	7440-67-7	E440	1.0	mg/kg	2.3	2.5	3.2	2.2	2.8	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.4	11.5	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.87	8.94	8.93	8.54	9.25	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.19	6.06	6.08	6.04	6.12	
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	1.97	1.85	1.99	1.93	1.90	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.180	0.425	0.395	0.125	0.121	
calcium, TCLP	7440-70-2	E444	10	mg/L	2280	2220	2300	2170	2250	
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	1.41	1.23	0.875	1.00	0.996	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.859	1.11	0.940	0.840	0.958	
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	140	135	135	135	136	
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	0.56	0.50	0.59	0.58	0.56	
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	BA2210-A-6	BA2210-A-7	BA2210-A-8	BA2210-A-9	BA2210-A-10
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00	09-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-006	VA22A5283-007	VA22A5283-008	VA22A5283-009	VA22A5283-010	
					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	48.1	37.8	34.1	41.2	27.2	
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	BA2210-A-11	BA2210-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	09-Mar-2022 09:00	09-Mar-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-011	VA22A5283-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	22.5	21.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	36400	48600	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	100	98.7	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	16.1	15.5	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	433	521	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.43	0.45	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	8.02	9.72	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	154	166	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	9.06	9.57	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	138000	150000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	162	158	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	27.1	673	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	4110	2920	----	----	----	
iron	7439-89-6	E440	50	mg/kg	64100	67100	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	291	330	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	32.9	268	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11600	13100	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1520	951	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.897	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	32.2	34.8	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	261	336	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10800	13200	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	6040	5480	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.27	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	4.74	5.49	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	19300	17800	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	593	863	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12900	12600	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.051	0.054	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2210-A-11	BA2210-A-12	----	----	----
Client sampling date / time					09-Mar-2022 09:00	09-Mar-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-011	VA22A5283-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	181	2960	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	243	266	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	17.5	19.6	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.55	5.84	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	49.9	59.2	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	3660	3520	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	4.7	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.51	8.47	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.14	6.04	----	----	----	
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	1.89	2.11	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.126	0.157	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2160	2210	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.933	1.83	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.892	1.14	----	----	----	
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	132	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	0.61	0.63	----	----	----	
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	BA2210-A-11	BA2210-A-12	----	----	----
					Client sampling date / time	09-Mar-2022 09:00	09-Mar-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A5283-011	VA22A5283-012	-----	-----	-----	
					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	37.3	38.0	----	----	----	
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	: VA22A5283	Page	: 1 of 16
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	: 15-Mar-2022 10:40
PO	: VANCO 0000051213	Issue Date	: 31-Mar-2022 10:24
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.

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 Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) 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	VA22A5283-001	BA2210-A-1	cobalt	7440-48-4	E440	44.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A5283-001	BA2210-A-1	nickel	7440-02-0	E440	58.5 % 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.

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-4402160 02	----	zinc	7440-66-6	E440	121 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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 BA2210-A-1	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-10	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-11	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-12	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-2	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-3	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-4	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-5	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-6	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-7	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-8	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2210-A-9	E510	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	28 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2210-A-1	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2210-A-10	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2210-A-11	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2210-A-12	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-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		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-2	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-3	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-4	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-5	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-6	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-7	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-8	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2210-A-9	E440	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	180 days	15 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2210-A-1	E144	09-Mar-2022	----	----	----		23-Mar-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 BA2210-A-10	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-11	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-12	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-2	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-3	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-4	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-5	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-6	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2210-A-7	E144	09-Mar-2022	----	----	----		23-Mar-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 BA2210-A-8	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2210-A-9	E144	09-Mar-2022	----	----	----		23-Mar-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-1	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-10	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-11	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-12	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-2	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-3	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-4	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-5	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-6	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-7	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-8	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2210-A-9	E108	09-Mar-2022	24-Mar-2022	----	----		24-Mar-2022	30 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-1	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-10	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-11	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-12	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 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) BA2210-A-2	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-3	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-4	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-5	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-6	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-7	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-8	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2210-A-9	E512	25-Mar-2022	----	----	----		30-Mar-2022	28 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-1	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 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) BA2210-A-10	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-11	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-12	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-2	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-3	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-4	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-5	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-6	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2210-A-7	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 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) BA2210-A-8	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2210-A-9	E444	25-Mar-2022	----	----	----		30-Mar-2022	180 days	21 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-1	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-10	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-11	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-12	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-2	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-3	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-4	EPP444	09-Mar-2022	25-Mar-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) BA2210-A-5	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-6	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-7	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-8	EPP444	09-Mar-2022	25-Mar-2022	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2210-A-9	EPP444	09-Mar-2022	25-Mar-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	440217	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	440216	2	19	10.5	5.0	✔
Moisture Content by Gravimetry	E144	440221	1	19	5.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	440218	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	440217	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	440216	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	440221	1	19	5.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	440218	1	19	5.2	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	446332	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	440217	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	446333	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	440216	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	440221	1	19	5.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	446332	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	446333	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 : VA22A5283

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 : 15-Mar-2022 10:40
Date Analysis Commenced : 23-Mar-2022
Issue Date : 31-Mar-2022 10:24

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. Lists names like Angela Ren, Caleb Deroche, Janice Leung, Kevin Duarte, Kim Jensen, Ophelia Chiu, Parnian Sane, Paul Cushing and their respective roles and departments.

Page : 2 of 11
Work Order : VA22A5283
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.

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: 440218)											
VA22A5283-001	BA2210-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.5	10.7	1.1%	5%	----
Physical Tests (QC Lot: 440221)											
VA22A5283-001	BA2210-A-1	moisture	----	E144	0.25	%	22.7	22.9	0.707%	20%	----
Metals (QC Lot: 440216)											
VA22A5283-001	BA2210-A-1	bismuth	7440-69-9	E440	0.20	mg/kg	8.46	8.22	2.84%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	8.42	8.70	3.25%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	150	120	22.5%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	2860	2880	0.505%	30%	----
		nickel	7440-02-0	E440	0.50	mg/kg	162	297	58.5%	30%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	711	532	28.8%	40%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3830	4050	5.74%	30%	----
VA22A5283-001	BA2210-A-1	aluminum	7429-90-5	E440	50	mg/kg	42300	35700	16.9%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	100	124	21.6%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	17.0	20.7	19.5%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	578	489	16.7%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.47	0.43	0.04	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	188	193	2.39%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	145000	152000	4.82%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	59.8	37.9	44.8%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	65500	53900	19.5%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	334	435	26.0%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	38.0	45.9	18.6%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	13400	15000	11.1%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	786	956	19.6%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	33.9	37.9	11.2%	40%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11700	13900	17.1%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5800	5870	1.35%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.35	0.33	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.95	6.04	1.53%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	18300	18600	1.48%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	316	380	18.5%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 440216) - continued											
VA22A5283-001	BA2210-A-1	sulfur	7704-34-9	E440	1000	mg/kg	13500	14800	9.42%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.067	0.017	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	96.2	110	13.8%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	21.4	23.8	10.7%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.49	6.32	14.0%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	52.8	55.7	5.40%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.2	0.3	Diff <2x LOR	----
Metals (QC Lot: 440217)											
VA22A5283-001	BA2210-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	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: 440221)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 440216)						
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: 440216) - 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: 440217)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 446332)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 446333)						
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: 440218)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	99.7	95.0	105	---
Physical Tests (QCLot: 440221)									
moisture	---	E144	0.25	%	50 %	100	90.0	110	---
Metals (QCLot: 440216)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	116	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	108	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	102	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	97.5	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	102	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	102	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.3	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	113	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	109	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	95.8	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	110	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	106	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	105	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	103	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: 440216) - continued									
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	109	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	109	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	# 121	80.0	120	MES
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	108	80.0	120	----
Metals (QCLot: 440217)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	109	80.0	120	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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: 446332)										
VA22A5283-001	BA2210-A-1	mercury, TCLP	7439-97-6	E512	0.0008 mg/L	0.001 mg/L	81.9	50.0	140	----
TCLP Metals (QCLot: 446333)										
VA22A5283-001	BA2210-A-1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.2 mg/L	5 mg/L	85.2	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.4 mg/L	12.5 mg/L	108	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.212 mg/L	0.25 mg/L	84.7	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.21 mg/L	10 mg/L	82.1	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.212 mg/L	0.25 mg/L	84.9	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	1.03 mg/L	1.25 mg/L	82.5	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	1.99 mg/L	2.5 mg/L	79.7	50.0	140	----
		iron, TCLP	7439-89-6	E444	212 mg/L	250 mg/L	84.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.3 mg/L	10 mg/L	103	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	285 mg/L	250 mg/L	114	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.03 mg/L	2.5 mg/L	81.2	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.42 mg/L	5 mg/L	88.4	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.096 mg/L	0.1 mg/L	96.1	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	99.8	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.27 mg/L	5 mg/L	105	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.65 mg/L	0.75 mg/L	86.4	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	9 mg/L	10 mg/L	87.1	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: **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: 440216)									
QC-440216-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	110	70.0	130	----
QC-440216-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	96.9	70.0	130	----
QC-440216-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-440216-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	107	70.0	130	----
QC-440216-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	104	70.0	130	----
QC-440216-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	117	40.0	160	----
QC-440216-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	97.5	70.0	130	----
QC-440216-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	104	70.0	130	----
QC-440216-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
QC-440216-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	103	70.0	130	----
QC-440216-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	102	70.0	130	----
QC-440216-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
QC-440216-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	105	70.0	130	----
QC-440216-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	101	70.0	130	----
QC-440216-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	107	70.0	130	----
QC-440216-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	111	70.0	130	----
QC-440216-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	114	70.0	130	----
QC-440216-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-440216-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	96.3	70.0	130	----
QC-440216-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	111	70.0	130	----
QC-440216-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	112	70.0	130	----
QC-440216-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	106	70.0	130	----
QC-440216-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	103	40.0	160	----
QC-440216-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	98.4	70.0	130	----
QC-440216-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	111	70.0	130	----
QC-440216-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
QC-440216-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----
QC-440216-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	119	70.0	130	----
QC-440216-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	94.2	70.0	130	----

Page : 11 of 11
 Work Order : VA22A5283
 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: 440217)									
QC-440217-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	108	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 Burnaby BC		Email 1: smckinney@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone: 604-521-1025 Fax: _____		Email 2: rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
<input type="checkbox"/> Yes <input type="checkbox"/> No		Email 3: dskrypnik@covanta.com		Analysis Request	
		brent.kirkpatrick@metrovancover.org			
		Sarah.Wellman@metrovancover.org			

Invoice To 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">Number of Containers</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></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:																																					
Phone: _____ Fax: _____		Quote #:																																			

Lab Work Order # (lab use only)		ALS Contact:		Sampler:	
5283					

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					
BA2210-A-1		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-2		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-3		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-4		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-5		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-6		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-7		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-8		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-9		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-10		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-11		09-Mar-22	9:00	Soil	X	X		X						1
BA2210-A-12		09-Mar-22	9:00	Soil	X	X		X						1

**Environmental Division
 Vancouver**
 Work Order Reference
VA22A5283

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: <i>RCL</i>	Date (dd-mmm-yy): 15/03/22	Time (hh-mm): 8:00	Received by: JC	Date: 15 Mar 2022	Time: 10:30 AM	Temperature: 20 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
										GENF 20.00 Front

1040 AM
 JC 15 Mar 2022