

Bottom Ash Data

2022 Week 13

The following analytical report represents bottom ash composite results for week 13 of 2022 (March 27, 2022 to April 2, 2022).

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



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **VA22A7004**
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 : 05-Apr-2022 12:00
Date Analysis Commenced : 16-Apr-2022
Issue Date : 25-Apr-2022 08:47

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
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	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	BA2213-A-1	BA2213-A-2	BA2213-A-3	BA2213-A-4	BA2213-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-001	VA22A7004-002	VA22A7004-003	VA22A7004-004	VA22A7004-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	20.0	20.4	21.6	19.5	21.3	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.1	11.1	11.0	11.1	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	42600	34700	32600	33400	41500	
antimony	7440-36-0	E440	0.10	mg/kg	139	120	114	165	135	
arsenic	7440-38-2	E440	0.10	mg/kg	21.4	24.6	18.2	28.2	19.1	
barium	7440-39-3	E440	0.50	mg/kg	504	395	630	477	632	
beryllium	7440-41-7	E440	0.10	mg/kg	0.45	0.44	0.38	0.52	0.41	
bismuth	7440-69-9	E440	0.20	mg/kg	7.43	9.78	6.90	9.17	8.73	
boron	7440-42-8	E440	5.0	mg/kg	237	186	191	271	261	
cadmium	7440-43-9	E440	0.020	mg/kg	20.6	11.7	9.21	14.2	12.8	
calcium	7440-70-2	E440	50	mg/kg	152000	144000	137000	169000	145000	
chromium	7440-47-3	E440	0.50	mg/kg	142	308	997	196	220	
cobalt	7440-48-4	E440	0.10	mg/kg	33.6	234	41.8	54.8	40.8	
copper	7440-50-8	E440	0.50	mg/kg	9550	3250	9910	3190	1910	
iron	7439-89-6	E440	50	mg/kg	66900	62800	66700	72000	65200	
lead	7439-92-1	E440	0.50	mg/kg	647	510	580	1190	868	
lithium	7439-93-2	E440	2.0	mg/kg	26.5	40.5	20.3	23.8	22.4	
magnesium	7439-95-4	E440	20	mg/kg	13500	13000	13500	16200	12400	
manganese	7439-96-5	E440	1.0	mg/kg	1040	827	1060	1120	1160	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0878	0.0809	0.0665	0.0979	0.0994	
molybdenum	7439-98-7	E440	0.10	mg/kg	37.5	38.2	168	35.6	27.2	
nickel	7440-02-0	E440	0.50	mg/kg	283	200	704	142	172	
phosphorus	7723-14-0	E440	50	mg/kg	13400	9670	11400	14000	11600	
potassium	7440-09-7	E440	100	mg/kg	5100	4970	5780	6670	5560	
selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.36	0.36	0.47	0.58	
silver	7440-22-4	E440	0.10	mg/kg	5.15	9.79	3.88	6.30	4.98	
sodium	7440-23-5	E440	50	mg/kg	17400	15400	17200	18200	15900	
strontium	7440-24-6	E440	0.50	mg/kg	370	365	337	419	350	
sulfur	7704-34-9	E440	1000	mg/kg	12600	13700	11700	15800	13500	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2213-A-1	BA2213-A-2	BA2213-A-3	BA2213-A-4	BA2213-A-5
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-001	VA22A7004-002	VA22A7004-003	VA22A7004-004	VA22A7004-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.057	0.060	0.054	0.078	0.074	
tin	7440-31-5	E440	2.0	mg/kg	135	179	115	164	135	
titanium	7440-32-6	E440	1.0	mg/kg	358	271	413	294	500	
tungsten	7440-33-7	E440	0.50	mg/kg	8.87	10.1	11.5	16.4	9.35	
uranium	7440-61-1	E440	0.050	mg/kg	5.62	5.72	5.36	6.95	5.62	
vanadium	7440-62-2	E440	0.20	mg/kg	49.4	48.8	48.8	60.5	59.0	
zinc	7440-66-6	E440	2.0	mg/kg	4610	3510	4070	6550	5730	
zirconium	7440-67-7	E440	1.0	mg/kg	3.3	1.7	1.1	1.4	2.2	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.7	11.7	11.7	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.32	9.30	9.12	9.23	8.81	
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	6.29	6.23	6.27	6.33	6.24	
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	2.03	2.18	2.04	2.12	2.18	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.180	0.147	0.167	0.146	0.183	
calcium, TCLP	7440-70-2	E444	10	mg/L	1960	2050	2150	2080	2150	
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	1.14	1.37	0.749	1.08	0.855	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.884	0.404	0.736	1.61	1.36	
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	0.28	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	146	138	151	151	148	
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	0.45	0.55	0.46	0.59	0.52	
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	BA2213-A-1	BA2213-A-2	BA2213-A-3	BA2213-A-4	BA2213-A-5
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-001	VA22A7004-002	VA22A7004-003	VA22A7004-004	VA22A7004-005	
					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	46.0	57.2	26.4	29.1	42.0	
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					Client sample ID	BA2213-A-6	BA2213-A-7	BA2213-A-8	BA2213-A-9	BA2213-A-10
(Matrix: Soil/Solid)										
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-006	VA22A7004-007	VA22A7004-008	VA22A7004-009	VA22A7004-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.8	21.2	21.6	21.3	21.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.1	11.0	11.0	11.0	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	50800	42400	31300	39400	41800	
antimony	7440-36-0	E440	0.10	mg/kg	132	145	129	193	154	
arsenic	7440-38-2	E440	0.10	mg/kg	20.7	19.7	26.8	28.2	21.8	
barium	7440-39-3	E440	0.50	mg/kg	650	514	481	405	425	
beryllium	7440-41-7	E440	0.10	mg/kg	0.60	0.42	0.44	0.45	0.60	
bismuth	7440-69-9	E440	0.20	mg/kg	7.37	11.5	27.4	1290	202	
boron	7440-42-8	E440	5.0	mg/kg	209	194	198	204	199	
cadmium	7440-43-9	E440	0.020	mg/kg	12.5	173	11.3	14.9	14.0	
calcium	7440-70-2	E440	50	mg/kg	149000	154000	148000	162000	163000	
chromium	7440-47-3	E440	0.50	mg/kg	151	144	161	162	161	
cobalt	7440-48-4	E440	0.10	mg/kg	207	91.4	61.7	48.7	57.6	
copper	7440-50-8	E440	0.50	mg/kg	2150	1760	1490	6000	3320	
iron	7439-89-6	E440	50	mg/kg	56800	52600	62800	65800	72400	
lead	7439-92-1	E440	0.50	mg/kg	574	604	1030	681	1730	
lithium	7439-93-2	E440	2.0	mg/kg	40.7	23.3	23.7	31.3	26.0	
magnesium	7439-95-4	E440	20	mg/kg	14300	13100	14300	14200	13800	
manganese	7439-96-5	E440	1.0	mg/kg	970	982	2300	960	1300	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0896	0.135	0.0897	0.166	0.0683	
molybdenum	7439-98-7	E440	0.10	mg/kg	34.5	35.4	38.1	35.1	30.1	
nickel	7440-02-0	E440	0.50	mg/kg	123	113	350	353	154	
phosphorus	7723-14-0	E440	50	mg/kg	11900	11000	11200	12100	13900	
potassium	7440-09-7	E440	100	mg/kg	6700	5660	6210	6720	5590	
selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.37	0.30	0.57	0.46	
silver	7440-22-4	E440.Ag	0.10	mg/kg	4.60	----	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	11.0	4.16	4.95	5.36	
sodium	7440-23-5	E440	50	mg/kg	18800	16400	17800	18400	17600	
strontium	7440-24-6	E440	0.50	mg/kg	377	386	367	370	377	
sulfur	7704-34-9	E440	1000	mg/kg	13000	13600	12800	14800	13800	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2213-A-6	BA2213-A-7	BA2213-A-8	BA2213-A-9	BA2213-A-10
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-006	VA22A7004-007	VA22A7004-008	VA22A7004-009	VA22A7004-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.063	0.066	0.063	0.069	0.067	
tin	7440-31-5	E440	2.0	mg/kg	109	154	119	192	211	
titanium	7440-32-6	E440	1.0	mg/kg	608	594	324	392	297	
tungsten	7440-33-7	E440	0.50	mg/kg	83.4	10.7	17.0	12.6	13.6	
uranium	7440-61-1	E440	0.050	mg/kg	6.00	6.50	5.77	6.71	6.47	
vanadium	7440-62-2	E440	0.20	mg/kg	59.0	70.2	52.0	57.0	53.4	
zinc	7440-66-6	E440	2.0	mg/kg	4340	3800	6450	6120	4390	
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.7	1.7	1.6	2.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.6	11.7	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.93	8.89	9.37	9.46	9.51	
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	6.21	6.19	6.20	6.23	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	2.24	2.38	2.02	2.08	2.68	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.162	0.222	0.140	0.159	0.222	
calcium, TCLP	7440-70-2	E444	10	mg/L	2080	2050	2050	1990	2050	
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	1.53	0.804	2.33	1.85	1.12	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.746	0.818	1.12	1.03	0.964	
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	0.42	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	146	143	150	135	146	
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	0.55	1.13	0.47	0.48	
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	BA2213-A-6	BA2213-A-7	BA2213-A-8	BA2213-A-9	BA2213-A-10
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	30-Mar-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-006	VA22A7004-007	VA22A7004-008	VA22A7004-009	VA22A7004-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	37.1	44.2	40.7	30.2	33.7	
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 (Matrix: Soil/Solid)					Client sample ID	BA2213-A-11	BA2213-A-12	----	----	----
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-011	VA22A7004-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	20.6	19.3	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.0	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	50700	39400	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	118	116	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	17.9	18.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	536	546	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.44	0.36	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	5.92	5.70	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	227	222	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.0	9.84	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	142000	132000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	166	580	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	171	131	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2810	5390	----	----	----	
iron	7439-89-6	E440	50	mg/kg	87800	92400	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	488	644	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	33.3	22.8	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	13200	14500	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1060	1680	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0885	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	19.9	80.8	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	133	510	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11400	9770	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5260	5680	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.34	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	3.50	4.43	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	16300	17000	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	360	326	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	13100	11500	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.056	0.056	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2213-A-11	BA2213-A-12	----	----	----
Client sampling date / time					30-Mar-2022 09:00	30-Mar-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-011	VA22A7004-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	172	105	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	587	508	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	8.39	11.2	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	5.63	5.01	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	50.8	56.1	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	5280	3700	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.2	1.4	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.5	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.96	9.09	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.14	6.21	---	---	---	
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	2.07	2.06	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.160	0.152	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	2030	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.98	1.14	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.750	0.584	---	---	---	
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	149	131	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.53	0.53	---	---	---	
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	BA2213-A-11	BA2213-A-12	----	----	----
					Client sampling date / time	30-Mar-2022 09:00	30-Mar-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A7004-011	VA22A7004-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	32.8	32.4	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22A7004	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	: 05-Apr-2022 12:00
PO	: VANCO 0000051213	Issue Date	: 25-Apr-2022 08:47
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 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	VA22A7004-001	BA2213-A-1	boron	7440-42-8	E440	41.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A7004-001	BA2213-A-1	cadmium	7440-43-9	E440	55.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A7004-001	BA2213-A-1	cobalt	7440-48-4	E440	89.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A7004-001	BA2213-A-1	copper	7440-50-8	E440	42.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A7004-001	BA2213-A-1	nickel	7440-02-0	E440	50.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2213-A-6	E440.Ag	30-Mar-2022	21-Apr-2022	180 days	22 days	✓	21-Apr-2022	158 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-1	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-10	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-11	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-12	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-2	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-3	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-4	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-5	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-6	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-7	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-8	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2213-A-9	E510	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	28 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2213-A-1	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2213-A-10	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2213-A-11	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-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		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-12	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-2	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-3	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-4	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-5	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-6	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-7	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-8	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	180 days	21 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2213-A-9	E440	30-Mar-2022	20-Apr-2022	----	----		20-Apr-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	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-1	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-10	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-11	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-12	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-2	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-3	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-4	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-5	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2213-A-6	E144	30-Mar-2022	----	----	----		19-Apr-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 BA2213-A-7	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2213-A-8	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2213-A-9	E144	30-Mar-2022	----	----	----		19-Apr-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-1	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-10	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-11	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-12	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-2	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-3	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-4	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-5	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-6	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-7	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-8	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2213-A-9	E108	30-Mar-2022	20-Apr-2022	----	----		20-Apr-2022	30 days	21 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-1	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-10	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-11	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 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) BA2213-A-12	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-2	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-3	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-4	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-5	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-6	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-7	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-8	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2213-A-9	E512	16-Apr-2022	----	----	----		19-Apr-2022	28 days	20 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) BA2213-A-1	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-10	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-11	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-12	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-2	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-3	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-4	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-5	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2213-A-6	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 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) BA2213-A-7	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2213-A-8	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2213-A-9	E444	16-Apr-2022	----	----	----		19-Apr-2022	180 days	20 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-1	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-10	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-11	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-12	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-2	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-3	EPP444	30-Mar-2022	16-Apr-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) BA2213-A-4	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-5	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-6	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-7	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-8	EPP444	30-Mar-2022	16-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2213-A-9	EPP444	30-Mar-2022	16-Apr-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	462391	1	13	7.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	462390	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	462394	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	462393	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	464284	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	462391	2	13	15.3	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	462390	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	462394	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	462393	1	13	7.6	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	464284	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	461988	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	462391	1	13	7.6	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	461989	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	462390	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	462394	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	461988	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	461989	1	12	8.3	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : VA22A7004

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 : 05-Apr-2022 12:00
Date Analysis Commenced : 16-Apr-2022
Issue Date : 25-Apr-2022 08:47

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 Angela Ren, Caleb Deroche, Dee Lee, Kevin Duarte, Ophelia Chiu, Robin Weeks.

Page : 2 of 11
Work Order : VA22A7004
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: 462393)											
VA22A7004-001	BA2213-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.1	0.2%	5%	----
Physical Tests (QC Lot: 462394)											
VA22A7004-001	BA2213-A-1	moisture	----	E144	0.25	%	20.0	19.3	3.30%	20%	----
Metals (QC Lot: 462390)											
VA22A7004-001	BA2213-A-1	aluminum	7429-90-5	E440	50	mg/kg	42600	39500	7.42%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	139	127	8.87%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	21.4	21.0	2.06%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	504	504	0.102%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.45	0.46	0.008	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	7.43	6.52	13.1%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	237	360	41.4%	30%	DUP-H
		cadmium	7440-43-9	E440	0.020	mg/kg	20.6	11.7	55.2%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	152000	154000	1.08%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	142	163	13.5%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	33.6	87.8	89.2%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	9550	6200	42.6%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	66900	71200	6.29%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	647	658	1.65%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	26.5	27.6	4.16%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	13500	14300	5.97%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1040	1190	14.2%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	37.5	34.6	7.96%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	283	168	50.9%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	13400	11400	16.4%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5100	6060	17.2%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.41	0.07	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.15	4.36	16.6%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	17400	17300	0.232%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	370	393	6.04%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	12600	13000	3.07%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.057	0.060	0.002	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: 462390) - continued											
VA22A7004-001	BA2213-A-1	tin	7440-31-5	E440	2.0	mg/kg	135	173	24.5%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	358	371	3.45%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	8.87	10.3	14.8%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.62	5.95	5.73%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	49.4	52.8	6.60%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4610	4510	2.15%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	3.3	1.7	1.6	Diff <2x LOR	----
Metals (QC Lot: 462391)											
VA22A7004-001	BA2213-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.0878	0.102	0.0146	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: 462394)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 462390)						
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: 462390) - 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: 462391)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 464284)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 461988)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 461989)						
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: 462393)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 462394)									
moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Metals (QCLot: 462390)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	112	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	111	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	103	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	105	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	107	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	102	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	107	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	115	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	116	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	109	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.4	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	115	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	106	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.8	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	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: 462390) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	112	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	110	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
Metals (QCLot: 462391)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	106	80.0	120	----
Metals (QCLot: 464284)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	100	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**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
TCLP Metals (QCLot: 461988)										
VA22A7004-001	BA2213-A-1	mercury, TCLP	7439-97-6	E512	0.0008 mg/L	0.001 mg/L	79.7	50.0	140	----
TCLP Metals (QCLot: 461989)										
VA22A7004-001	BA2213-A-1	antimony, TCLP	7440-36-0	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	94.4	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.0 mg/L	12.5 mg/L	104	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.227 mg/L	0.25 mg/L	90.8	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.55 mg/L	10 mg/L	95.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.230 mg/L	0.25 mg/L	91.9	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	1.17 mg/L	1.25 mg/L	93.9	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	2.18 mg/L	2.5 mg/L	87.3	50.0	140	----
		iron, TCLP	7439-89-6	E444	229 mg/L	250 mg/L	91.8	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.55 mg/L	10 mg/L	95.5	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	260 mg/L	250 mg/L	104	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.23 mg/L	2.5 mg/L	89.3	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.60 mg/L	5 mg/L	92.1	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.100 mg/L	0.1 mg/L	100	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	96.2	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.84 mg/L	5 mg/L	96.7	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.70 mg/L	0.75 mg/L	92.9	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	87.5	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: 462390)									
QC-462390-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	120	70.0	130	----
QC-462390-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	122	70.0	130	----
QC-462390-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	114	70.0	130	----
QC-462390-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	112	70.0	130	----
QC-462390-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	118	70.0	130	----
QC-462390-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	131	40.0	160	----
QC-462390-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	106	70.0	130	----
QC-462390-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	113	70.0	130	----
QC-462390-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	121	70.0	130	----
QC-462390-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	118	70.0	130	----
QC-462390-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	109	70.0	130	----
QC-462390-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	112	70.0	130	----
QC-462390-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	117	70.0	130	----
QC-462390-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	115	70.0	130	----
QC-462390-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	113	70.0	130	----
QC-462390-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	116	70.0	130	----
QC-462390-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	112	70.0	130	----
QC-462390-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	113	70.0	130	----
QC-462390-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	111	70.0	130	----
QC-462390-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	122	70.0	130	----
QC-462390-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	117	70.0	130	----
QC-462390-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	120	70.0	130	----
QC-462390-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	116	40.0	160	----
QC-462390-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	107	70.0	130	----
QC-462390-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
QC-462390-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	119	70.0	130	----
QC-462390-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	116	70.0	130	----
QC-462390-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	106	70.0	130	----
QC-462390-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	102	70.0	130	----

Page : 11 of 11
 Work Order : VA22A7004
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

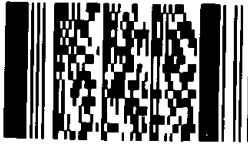
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 462391)									
QC-462391-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	104	70.0	130	----



Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)					
Contact: Steve McKinney / Dan Skrypnik			<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT					
Address: 5150 Riverbend Drive			Email 1: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Burnaby BC			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Phone: 604-521-1025			Email 3: dskrypnik@covanta.com			Analysis Request					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			brent.kirkpatrick@metrovancover.org								
			Sarah.Wellman@metrovancover.org								

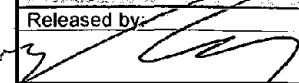
Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Client / Project Information			Please indicate below Filtered, Preserved or both (F, P, F/P)																																		
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			Job #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td colspan="6"></td> <td rowspan="4">Number of Containers</td> </tr> <tr><td colspan="6"></td></tr> <tr><td colspan="6"></td></tr> <tr><td colspan="6"></td></tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)							Number of Containers																		
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)													Number of Containers																								
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																																					
Contact:			LSD: (includes 2:1 pH)																																					
Address:			Quote #:																																					
Phone:			Fax:																																					

Lab Work Order # (lab use only) 7004			ALS Contact:			Sampler:					
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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
BA2213-A-1	Environmental Division Vancouver Work Order Reference VA22A7004  Telephone: +1 604 253 4188	30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-2		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-3		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-4		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-5		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-6		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-7		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-8		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-9		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-10		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-11		30-Mar-22	9:00	Soil	X	X		X							1
BA2213-A-12		30-Mar-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): 5-APR-22	Time (hh-mm): 0800	Received by: JC	Date: 5 APR 22	Time: 12pm	Temperature: 19 °C	Verified by:	Date:	Time:	Observations:	
										Yes / No ? If Yes add SIF	