

Bottom Ash Data

2022 Week 21

The following analytical report represents bottom ash composite results for week 21 of 2022 (May 22, 2022 to May 28, 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 : **VA22B1933**
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 : 31-May-2022 12:00
Date Analysis Commenced : 06-Jun-2022
Issue Date : 13-Jun-2022 10:16

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - 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	BA2221-A-1	BA2221-A-2	BA2221-A-3	BA2221-A-4	BA2221-A-5
(Matrix: Soil/Solid)					Client sampling date / time	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-001	VA22B1933-002	VA22B1933-003	VA22B1933-004	VA22B1933-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	16.1	17.8	17.0	18.5	16.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.6	11.6	11.6	11.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	47300	32300	37500	70900	38200	
antimony	7440-36-0	E440	0.10	mg/kg	92.2	147	101	81.6	111	
arsenic	7440-38-2	E440	0.10	mg/kg	33.2	26.0	26.9	20.2	44.4	
barium	7440-39-3	E440	0.50	mg/kg	662	681	641	696	659	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.42	0.38	0.40	0.56	
bismuth	7440-69-9	E440	0.20	mg/kg	7.55	10.2	9.24	6.95	5.15	
boron	7440-42-8	E440	5.0	mg/kg	183	176	148	268	247	
cadmium	7440-43-9	E440	0.020	mg/kg	10.6	9.53	9.25	7.90	6.95	
calcium	7440-70-2	E440	50	mg/kg	135000	146000	139000	128000	138000	
chromium	7440-47-3	E440	0.50	mg/kg	413	181	157	146	198	
cobalt	7440-48-4	E440	0.10	mg/kg	86.2	87.2	371	29.4	42.3	
copper	7440-50-8	E440	0.50	mg/kg	2640	2860	1760	3300	1190	
iron	7439-89-6	E440	50	mg/kg	75200	90500	44100	41000	48400	
lead	7439-92-1	E440	0.50	mg/kg	450	5410	1110	400	455	
lithium	7439-93-2	E440	2.0	mg/kg	21.5	25.8	32.7	57.7	23.4	
magnesium	7439-95-4	E440	20	mg/kg	13500	14400	13900	14100	15100	
manganese	7439-96-5	E440	1.0	mg/kg	888	883	752	962	2050	
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	85.3	25.9	22.2	17.2	53.9	
nickel	7440-02-0	E440	0.50	mg/kg	240	180	118	89.9	127	
phosphorus	7723-14-0	E440	50	mg/kg	11200	11800	12200	10800	9380	
potassium	7440-09-7	E440	100	mg/kg	5450	5520	5860	5790	5580	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.30	0.32	0.27	0.27	
silver	7440-22-4	E440	0.10	mg/kg	7.51	18.4	9.85	13.4	4.64	
sodium	7440-23-5	E440	50	mg/kg	15600	15600	16600	18000	17900	
strontium	7440-24-6	E440	0.50	mg/kg	321	363	312	303	333	
sulfur	7704-34-9	E440	1000	mg/kg	13400	13500	13100	11400	11400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2221-A-1	BA2221-A-2	BA2221-A-3	BA2221-A-4	BA2221-A-5
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-001	VA22B1933-002	VA22B1933-003	VA22B1933-004	VA22B1933-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.060	0.062	0.060	0.056	<0.050	
tin	7440-31-5	E440	2.0	mg/kg	99.2	113	92.2	71.7	101	
titanium	7440-32-6	E440	1.0	mg/kg	341	328	278	653	492	
tungsten	7440-33-7	E440	0.50	mg/kg	8.92	11.9	10.5	13.6	7.03	
uranium	7440-61-1	E440	0.050	mg/kg	4.67	4.85	4.76	4.21	4.44	
vanadium	7440-62-2	E440	0.20	mg/kg	56.9	60.0	62.0	87.1	58.3	
zinc	7440-66-6	E440	2.0	mg/kg	3440	3520	4050	3710	4380	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	1.0	1.2	1.7	<1.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	12.0	12.0	12.0	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.36	8.42	8.01	8.49	9.05	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	6.76	6.24	6.77	6.66	6.63	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.80	1.68	1.84	1.89	1.94	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.105	0.114	0.172	0.140	0.125	
calcium, TCLP	7440-70-2	E444	10	mg/L	1900	1820	1950	2030	2020	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.617	0.593	0.667	0.587	0.790	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.554	0.132	0.573	0.669	0.750	
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	0.81	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	142	142	145	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	0.72	0.59	0.37	0.45	0.46	
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	BA2221-A-1	BA2221-A-2	BA2221-A-3	BA2221-A-4	BA2221-A-5
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-001	VA22B1933-002	VA22B1933-003	VA22B1933-004	VA22B1933-005	
					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	17.8	27.5	12.6	20.8	19.2	
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	BA2221-A-6	BA2221-A-7	BA2221-A-8	BA2221-A-9	BA2221-A-10
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-006	VA22B1933-007	VA22B1933-008	VA22B1933-009	VA22B1933-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.9	16.9	17.4	18.6	17.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.8	11.6	11.5	11.6	11.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	37700	39100	36300	44000	36200	
antimony	7440-36-0	E440	0.10	mg/kg	82.0	95.0	95.3	93.2	93.1	
arsenic	7440-38-2	E440	0.10	mg/kg	23.8	20.9	21.6	20.0	23.5	
barium	7440-39-3	E440	0.50	mg/kg	609	603	658	669	748	
beryllium	7440-41-7	E440	0.10	mg/kg	0.57	0.43	0.43	0.67	0.44	
bismuth	7440-69-9	E440	0.20	mg/kg	7.27	6.84	30.9	6.09	5.59	
boron	7440-42-8	E440	5.0	mg/kg	216	184	188	161	202	
cadmium	7440-43-9	E440	0.020	mg/kg	9.65	8.63	10.7	8.08	8.09	
calcium	7440-70-2	E440	50	mg/kg	140000	140000	141000	140000	151000	
chromium	7440-47-3	E440	0.50	mg/kg	136	146	218	131	168	
cobalt	7440-48-4	E440	0.10	mg/kg	21.1	40.8	31.0	23.0	1080	
copper	7440-50-8	E440	0.50	mg/kg	1220	1080	1120	1460	2050	
iron	7439-89-6	E440	50	mg/kg	50500	46600	60200	49100	72400	
lead	7439-92-1	E440	0.50	mg/kg	545	462	528	1060	407	
lithium	7439-93-2	E440	2.0	mg/kg	23.1	22.9	20.6	21.6	62.0	
magnesium	7439-95-4	E440	20	mg/kg	13200	14300	13500	14100	13600	
manganese	7439-96-5	E440	1.0	mg/kg	1070	773	836	893	866	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	20.2	31.3	20.5	25.9	20.3	
nickel	7440-02-0	E440	0.50	mg/kg	146	85.2	94.0	109	207	
phosphorus	7723-14-0	E440	50	mg/kg	10300	9900	9680	10900	12900	
potassium	7440-09-7	E440	100	mg/kg	4610	5510	5110	5470	5330	
selenium	7782-49-2	E440	0.20	mg/kg	0.26	0.34	0.27	0.28	0.33	
silver	7440-22-4	E440	0.10	mg/kg	3.61	5.33	6.32	11.4	4.90	
sodium	7440-23-5	E440	50	mg/kg	14800	15300	15800	15100	16500	
strontium	7440-24-6	E440	0.50	mg/kg	359	328	335	354	326	
sulfur	7704-34-9	E440	1000	mg/kg	10500	11900	11900	11900	11800	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.055	<0.050	0.055	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2221-A-6	BA2221-A-7	BA2221-A-8	BA2221-A-9	BA2221-A-10
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-006	VA22B1933-007	VA22B1933-008	VA22B1933-009	VA22B1933-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	71.9	85.6	92.7	96.0	130	
titanium	7440-32-6	E440	1.0	mg/kg	290	334	419	357	321	
tungsten	7440-33-7	E440	0.50	mg/kg	10.5	7.48	10.0	11.8	15.5	
uranium	7440-61-1	E440	0.050	mg/kg	4.23	4.55	4.45	4.87	4.39	
vanadium	7440-62-2	E440	0.20	mg/kg	51.0	57.4	58.3	57.6	54.7	
zinc	7440-66-6	E440	2.0	mg/kg	3960	3510	3030	2760	5290	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	1.3	<1.0	1.3	1.1	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	12.0	12.0	12.0	12.0	12.0	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.88	8.81	9.14	9.60	9.45	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	6.85	6.60	6.39	6.70	6.41	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.85	1.88	2.07	1.97	1.73	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.162	0.116	0.183	0.109	0.127	
calcium, TCLP	7440-70-2	E444	10	mg/L	1950	2060	2010	2040	1930	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.15	0.819	1.04	0.985	0.585	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.602	0.710	0.612	0.820	0.528	
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	146	148	146	152	143	
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	0.36	0.50	0.45	0.38	1.62	
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	BA2221-A-6	BA2221-A-7	BA2221-A-8	BA2221-A-9	BA2221-A-10
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00	25-May-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-006	VA22B1933-007	VA22B1933-008	VA22B1933-009	VA22B1933-010	
					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	17.6	38.0	28.6	17.2	25.8	
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	BA2221-A-11	BA2221-A-12	----	----	----
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-011	VA22B1933-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	17.9	16.8	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.7	11.7	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	52400	56600	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	83.5	99.5	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	20.4	21.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	626	784	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.45	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	9.48	5.74	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	184	155	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	16.7	7.52	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	114000	130000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	118	145	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	29.2	26.0	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1980	1250	----	----	----	
iron	7439-89-6	E440	50	mg/kg	54200	59200	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	415	520	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	21.6	22.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11000	12500	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	852	905	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	16.3	20.2	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	75.2	725	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	9040	8890	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4720	5060	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.24	0.33	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	3.61	4.46	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	13400	14400	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	437	339	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	10600	10300	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2221-A-11	BA2221-A-12	----	----	----
Client sampling date / time					25-May-2022 09:00	25-May-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-011	VA22B1933-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	69.5	110	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	841	1440	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	7.46	9.13	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	4.02	4.10	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	58.4	56.8	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	4230	3590	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.5	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	12.0	12.0	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.71	9.60	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.35	6.31	---	---	---	
antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	---	---	---	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	---	---	---	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	---	---	---	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.87	1.81	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.134	0.286	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2010	1840	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.991	0.635	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.18	1.46	---	---	---	
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	156	140	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.43	0.48	---	---	---	
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	BA2221-A-11	BA2221-A-12	----	----	----
					Client sampling date / time	25-May-2022 09:00	25-May-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B1933-011	VA22B1933-012	-----	-----	-----	
					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	27.4	28.8	----	----	----	
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	: VA22B1933	Page	: 1 of 15
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 31-May-2022 12:00
PO	: VANCO 0000051213	Issue Date	: 13-Jun-2022 10:16
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group 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 BA2221-A-1	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-10	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-11	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-12	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-2	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-3	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2221-A-4	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 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 BA2221-A-5	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2221-A-6	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2221-A-7	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2221-A-8	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2221-A-9	E510	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	28 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2221-A-1	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2221-A-10	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2221-A-11	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2221-A-12	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 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 BA2221-A-2	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-3	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-4	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-5	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-6	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-7	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-8	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2221-A-9	E440	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	180 days	14 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2221-A-1	E144	25-May-2022	----	----	----		06-Jun-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 BA2221-A-10	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-11	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-12	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-2	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-3	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-4	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-5	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-6	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-7	E144	25-May-2022	----	----	----		06-Jun-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 BA2221-A-8	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2221-A-9	E144	25-May-2022	----	----	----		06-Jun-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-1	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-10	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-11	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-12	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-2	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-3	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2221-A-4	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 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 BA2221-A-5	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2221-A-6	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2221-A-7	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2221-A-8	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2221-A-9	E108	25-May-2022	08-Jun-2022	----	----		08-Jun-2022	30 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-1	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-10	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-11	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-12	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 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) BA2221-A-2	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-3	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-4	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-5	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-6	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-7	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-8	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2221-A-9	E512	06-Jun-2022	----	----	----		08-Jun-2022	28 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-1	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 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) BA2221-A-10	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-11	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-12	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-2	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-3	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-4	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-5	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-6	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2221-A-7	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 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) BA2221-A-8	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2221-A-9	E444	06-Jun-2022	----	----	----		08-Jun-2022	180 days	14 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-1	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-10	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-11	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-12	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-2	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-3	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-4	EPP444	25-May-2022	06-Jun-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) BA2221-A-5	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-6	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-7	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-8	EPP444	25-May-2022	06-Jun-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2221-A-9	EPP444	25-May-2022	06-Jun-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	512842	1	20	5.0	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	512843	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	512845	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	512844	1	20	5.0	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	512842	2	20	10.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	512843	2	20	10.0	10.0	✔
Moisture Content by Gravimetry	E144	512845	1	13	7.6	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	512844	1	20	5.0	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	515458	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	512842	1	20	5.0	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	515459	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	512843	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	512845	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	515458	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	515459	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. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 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	: VA22B1933	Page	: 1 of 11
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	: 31-May-2022 12:00
PO	: VANCO 0000051213	Date Analysis Commenced	: 06-Jun-2022
C-O-C number	: ----	Issue Date	: 13-Jun-2022 10:16
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 11
Work Order : VA22B1933
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 512844)											
VA22B1623-003	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.71	8.76	0.6%	5%	----
Physical Tests (QC Lot: 512845)											
VA22B1806-009	Anonymous	moisture	----	E144	0.25	%	81.6	81.6	0.0371%	20%	----
Metals (QC Lot: 512842)											
VA22B1623-003	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 512843)											
VA22B1623-003	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	23800	22300	6.31%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.30	0.29	0.01	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.85	5.37	8.56%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	96.2	96.3	0.0613%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.30	0.28	0.01	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	6.0	5.9	0.2	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.104	0.104	0.0004	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	10100	9910	2.34%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	32.0	30.7	4.14%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	12.7	12.2	3.53%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	39.5	38.0	3.94%	30%	----
		iron	7439-89-6	E440	50	mg/kg	31800	30600	4.01%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	4.58	4.44	3.14%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	16.8	16.3	2.82%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11200	10900	2.95%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	502	488	2.81%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.16	1.25	7.90%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	23.8	23.3	2.16%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	734	723	1.60%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	3290	3230	2.02%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.27	0.29	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.11	0.11	0.005	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	1290	1260	2.41%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	82.0	81.8	0.177%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Metals (QC Lot: 512843) - continued											
VA22B1623-003	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	2600	1900	600	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.092	0.093	0.0004	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1580	1510	4.72%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.900	0.859	4.76%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	87.9	85.2	3.13%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	64.8	63.4	2.26%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	4.6	5.0	0.4	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 512845)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 512842)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 512843)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 512843) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 515458)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 515459)						
antimony, TCLP	7440-36-0	E444	0.1	mg/L	<1.00	----
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: 512844)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 512845)									
moisture	----	E144	0.25	%	50 %	98.3	90.0	110	----
Metals (QCLot: 512842)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	111	80.0	120	----
Metals (QCLot: 512843)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	118	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	118	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	117	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	100	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	114	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	107	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	115	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	110	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	108	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	107	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	108	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	99.1	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	113	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	114	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	100	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	117	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	106	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	113	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	120	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	116	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	112	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 512843) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	111	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	110	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	103	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	118	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	109	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	106	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: 515458)										
VA22B1933-001	BA2221-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	96.7	50.0	140	----
TCLP Metals (QCLot: 515459)										
VA22B1933-001	BA2221-A-1	antimony, TCLP	7440-36-0	E444	5.19 mg/L	5 mg/L	104	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.9 mg/L	5 mg/L	98.5	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.8 mg/L	12.5 mg/L	103	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.236 mg/L	0.25 mg/L	94.5	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.23 mg/L	10 mg/L	92.3	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.244 mg/L	0.25 mg/L	97.5	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	1.24 mg/L	1.25 mg/L	99.0	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	2.29 mg/L	2.5 mg/L	91.8	50.0	140	----
		iron, TCLP	7439-89-6	E444	229 mg/L	250 mg/L	91.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.46 mg/L	10 mg/L	94.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	273 mg/L	250 mg/L	109	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.34 mg/L	2.5 mg/L	93.4	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.90 mg/L	5 mg/L	97.9	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.106 mg/L	0.1 mg/L	106	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	93.7	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.78 mg/L	5 mg/L	95.6	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.75 mg/L	0.75 mg/L	100	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	93.2	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 512842)									
	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	106	70.0	130	---
Metals (QCLot: 512843)									
	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	118	70.0	130	---
	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	110	70.0	130	---
	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	117	70.0	130	---
	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	114	70.0	130	---
	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	113	70.0	130	---
	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	125	40.0	160	---
	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	112	70.0	130	---
	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	115	70.0	130	---
	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	124	70.0	130	---
	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	113	70.0	130	---
	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	110	70.0	130	---
	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	111	70.0	130	---
	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	112	70.0	130	---
	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	118	70.0	130	---
	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	123	70.0	130	---
	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	116	70.0	130	---
	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	118	70.0	130	---
	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	110	70.0	130	---
	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	110	70.0	130	---
	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	125	70.0	130	---
	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	112	70.0	130	---
	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	121	70.0	130	---
	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	109	40.0	160	---
	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	108	70.0	130	---
	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	---
	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	118	70.0	130	---
	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	119	70.0	130	---

Page : 11 of 11
 Work Order : VA22B1933
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 512843) - continued									
	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	107	70.0	130	----
	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	96.4	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 Skrypnyk	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive Burnaby BC	Email 1:	smckinney@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Phone:	604-521-1025	Email 2:	rjohnson4@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Fax:		Email 3:	dskrypnyk@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Analysis Request	
<input type="checkbox"/> Yes	<input type="checkbox"/> No
brent.kirkpatrick@metrovancoûver.org	
Sarah.Wellman@metrovancoûver.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 #:									
Company:		PO / A/E:	PO# 46693 Weekly Bottom Ash - Suite								
Contact:		LSD:	(includes 2:1 pH)								
Address:		Quote #:									
Phone:		ALS Contact:									

Lab Work Order # (lab use only)	1933	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
					X	X			X	X	
BA2221-A-1	Environmental Division Vancouver Work Order Reference VA22B1933  Telephone : +1 604 253 4188	25-May-22	9:00	Soil	X	X			X		1
BA2221-A-2		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-3		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-4		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-5		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-6		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-7		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-8		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-9		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-10		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-11		25-May-22	9:00	Soil	X	X			X		1
BA2221-A-12		25-May-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)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	31-May-22	0800	JC	31 May 22	12 PM	21, 21 °C				Yes / No ? If Yes add SIF