

Bottom Ash Data

2022 Week 5

The following analytical report represents bottom ash composite results for week 5 of 2022 (January 30, 2022 to February 5, 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 : **VA22A2489**
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 : 08-Feb-2022 11:15
Date Analysis Commenced : 12-Feb-2022
Issue Date : 17-Feb-2022 12:18

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2205-A-1	BA2205-A-2	BA2205-A-3	BA2205-A-4	BA2205-A-5
Client sampling date / time					02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-001	VA22A2489-002	VA22A2489-003	VA22A2489-004	VA22A2489-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	21.9	25.3	23.2	25.2	26.2
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.2	10.4	10.3	10.2
Metals									
aluminum	7429-90-5	E440	50	mg/kg	41300	49800	36100	59200	35000
antimony	7440-36-0	E440	0.10	mg/kg	141	142	134	210	126
arsenic	7440-38-2	E440	0.10	mg/kg	21.4	18.7	22.8	18.8	17.8
barium	7440-39-3	E440	0.50	mg/kg	693	740	675	628	610
beryllium	7440-41-7	E440	0.10	mg/kg	0.51	0.49	0.38	0.45	0.43
bismuth	7440-69-9	E440	0.20	mg/kg	12.7	17.1	9.35	15.6	9.30
boron	7440-42-8	E440	5.0	mg/kg	187	281	203	173	192
cadmium	7440-43-9	E440	0.020	mg/kg	13.1	31.7	10.1	13.1	12.2
calcium	7440-70-2	E440	50	mg/kg	178000	157000	141000	146000	148000
chromium	7440-47-3	E440	0.50	mg/kg	299	197	200	176	272
cobalt	7440-48-4	E440	0.10	mg/kg	160	35.2	451	210	64.1
copper	7440-50-8	E440	0.50	mg/kg	3730	2710	13800	2170	3970
iron	7439-89-6	E440	50	mg/kg	106000	94600	91300	70500	82200
lead	7439-92-1	E440	0.50	mg/kg	540	426	347	7790	450
lithium	7439-93-2	E440	2.0	mg/kg	31.1	50.2	29.5	31.3	40.8
magnesium	7439-95-4	E440	20	mg/kg	15200	13500	12000	13300	13800
manganese	7439-96-5	E440	1.0	mg/kg	1670	969	1320	1140	1250
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0.0752	<0.0500	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	39.3	30.8	28.6	36.0	30.5
nickel	7440-02-0	E440	0.50	mg/kg	288	176	379	297	298
phosphorus	7723-14-0	E440	50	mg/kg	16500	14200	13400	12800	12100
potassium	7440-09-7	E440	100	mg/kg	5920	6020	4830	5550	5450
selenium	7782-49-2	E440	0.20	mg/kg	0.47	0.34	0.36	0.34	0.38
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	>109	----	----
silver	7440-22-4	E440	0.10	mg/kg	7.76	10.0	----	5.83	18.9
sodium	7440-23-5	E440	50	mg/kg	19400	18800	16300	17800	18000
strontium	7440-24-6	E440	0.50	mg/kg	531	335	335	335	735



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2205-A-1	BA2205-A-2	BA2205-A-3	BA2205-A-4	BA2205-A-5
Client sampling date / time					02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-001	VA22A2489-002	VA22A2489-003	VA22A2489-004	VA22A2489-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	14900	14000	12400	12900	12400
thallium	7440-28-0	E440	0.050	mg/kg	0.090	0.070	0.063	0.079	0.060
tin	7440-31-5	E440	2.0	mg/kg	202	142	163	200	332
titanium	7440-32-6	E440	1.0	mg/kg	346	465	403	648	381
tungsten	7440-33-7	E440	0.50	mg/kg	17.6	15.1	14.2	14.8	16.1
uranium	7440-61-1	E440	0.050	mg/kg	7.98	6.95	6.06	6.71	6.08
vanadium	7440-62-2	E440	0.20	mg/kg	66.2	57.5	52.0	55.0	54.3
zinc	7440-66-6	E440	2.0	mg/kg	4700	5360	4130	4740	3860
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	2.3	2.1	3.7	2.2
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.3	11.4	11.4	11.4
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.02	8.39	8.41	8.53	8.74
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	6.30	6.23	6.20	6.32	6.08
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.94	2.21	2.05	3.17	2.29
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.129	0.156	0.166	0.140	0.224
calcium, TCLP	7440-70-2	E444	10	mg/L	2190	2150	2100	2200	2080
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	1.79	0.845	1.24	1.33	1.56
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.641	0.882	0.528	0.597	0.856
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	153	148	148	150	142
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	1.17	0.79	0.79	0.52	0.61
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



Analytical Results

Sub-Matrix: Soil/Solid
 (Matrix: Soil/Solid)

					Client sample ID	BA2205-A-1	BA2205-A-2	BA2205-A-3	BA2205-A-4	BA2205-A-5
					Client sampling date / time	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-001	VA22A2489-002	VA22A2489-003	VA22A2489-004	VA22A2489-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<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	<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	26.8	47.0	38.6	27.3	34.3	
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/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2205-A-6	BA2205-A-7	BA2205-A-8	BA2205-A-9	BA2205-A-10
Client sampling date / time					02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-006	VA22A2489-007	VA22A2489-008	VA22A2489-009	VA22A2489-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	25.0	23.9	25.4	24.9	22.9
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.4	10.4	10.2	10.2
Metals									
aluminum	7429-90-5	E440	50	mg/kg	40600	40100	38100	34000	36800
antimony	7440-36-0	E440	0.10	mg/kg	146	111	131	191	160
arsenic	7440-38-2	E440	0.10	mg/kg	18.2	18.0	21.5	19.8	18.8
barium	7440-39-3	E440	0.50	mg/kg	568	632	672	723	747
beryllium	7440-41-7	E440	0.10	mg/kg	0.44	0.36	0.41	0.48	0.46
bismuth	7440-69-9	E440	0.20	mg/kg	11.2	10.5	14.8	14.4	11.8
boron	7440-42-8	E440	5.0	mg/kg	192	158	244	264	237
cadmium	7440-43-9	E440	0.020	mg/kg	12.3	8.98	11.0	16.8	12.1
calcium	7440-70-2	E440	50	mg/kg	155000	126000	148000	148000	162000
chromium	7440-47-3	E440	0.50	mg/kg	180	173	153	191	210
cobalt	7440-48-4	E440	0.10	mg/kg	122	157	81.9	71.8	72.9
copper	7440-50-8	E440	0.50	mg/kg	1800	12000	3070	26700	6110
iron	7439-89-6	E440	50	mg/kg	71900	93600	63800	80500	71700
lead	7439-92-1	E440	0.50	mg/kg	394	896	1010	3770	1020
lithium	7439-93-2	E440	2.0	mg/kg	28.9	23.0	24.4	30.1	32.3
magnesium	7439-95-4	E440	20	mg/kg	14900	11800	12400	13100	14800
manganese	7439-96-5	E440	1.0	mg/kg	1240	1120	1370	1410	950
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	27.8	27.1	29.0	43.5	28.7
nickel	7440-02-0	E440	0.50	mg/kg	176	177	190	162	141
phosphorus	7723-14-0	E440	50	mg/kg	13300	9910	12600	14000	14700
potassium	7440-09-7	E440	100	mg/kg	5480	4890	5520	5810	6040
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.28	0.35	0.37	0.39
silver	7440-22-4	E440	0.10	mg/kg	6.98	11.5	6.38	6.13	21.7
sodium	7440-23-5	E440	50	mg/kg	17700	16200	17300	18600	18800
strontium	7440-24-6	E440	0.50	mg/kg	354	370	364	393	388
sulfur	7704-34-9	E440	1000	mg/kg	15100	10400	13000	13500	14000
thallium	7440-28-0	E440	0.050	mg/kg	0.073	0.056	0.075	0.072	0.068



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2205-A-6	BA2205-A-7	BA2205-A-8	BA2205-A-9	BA2205-A-10
Client sampling date / time					02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-006	VA22A2489-007	VA22A2489-008	VA22A2489-009	VA22A2489-010
					Result	Result	Result	Result	Result
Metals									
tin	7440-31-5	E440	2.0	mg/kg	145	195	213	142	121
titanium	7440-32-6	E440	1.0	mg/kg	462	598	458	355	330
tungsten	7440-33-7	E440	0.50	mg/kg	15.2	11.1	15.1	13.1	19.2
uranium	7440-61-1	E440	0.050	mg/kg	7.02	5.45	7.01	7.16	6.97
vanadium	7440-62-2	E440	0.20	mg/kg	57.6	48.9	53.9	59.0	58.9
zinc	7440-66-6	E440	2.0	mg/kg	5640	6650	4200	4530	5250
zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.0	1.7	1.4	1.8
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.4	11.3	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.28	8.65	8.66	8.69	8.62
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	6.31	6.15	6.24	6.21	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	2.05	2.06	2.10	2.05	1.85
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.344	0.209	0.193	0.420	1.91
calcium, TCLP	7440-70-2	E444	10	mg/L	2170	2200	2090	2170	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	0.967	0.713	1.46	1.55	1.08
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.692	1.38	0.787	0.391	0.888
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	143	152	146	148	135
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.64	0.63	0.62	0.64	0.54
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/Solid
 (Matrix: Soil/Solid)

					Client sample ID	BA2205-A-6	BA2205-A-7	BA2205-A-8	BA2205-A-9	BA2205-A-10
					Client sampling date / time	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00	02-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-006	VA22A2489-007	VA22A2489-008	VA22A2489-009	VA22A2489-010	
					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	40.7	36.4	52.6	36.3	43.7	
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/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2205-A-11	BA2205-A-12	----	----	----
					02-Feb-2022 09:00	02-Feb-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-011	VA22A2489-012	-----	-----	-----
					Result	Result	---	---	---
Physical Tests									
moisture	----	E144	0.25	%	24.9	23.1	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	41400	41800	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	119	147	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	18.6	19.5	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	660	518	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.47	0.44	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	13.8	10.2	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	219	189	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	13.1	13.0	----	----	----
calcium	7440-70-2	E440	50	mg/kg	151000	153000	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	217	218	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	79.3	37.0	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	2070	5740	----	----	----
iron	7439-89-6	E440	50	mg/kg	88000	85000	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	1120	496	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	27.0	25.8	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	13200	13800	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	1050	1190	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.168	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	33.4	30.9	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	215	224	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	14000	13900	----	----	----
potassium	7440-09-7	E440	100	mg/kg	5660	6200	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.45	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	9.45	5.82	----	----	----
sodium	7440-23-5	E440	50	mg/kg	18800	18900	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	374	405	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	12600	14900	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.063	0.062	----	----	----



Analytical Results

Sub-Matrix: Soil/Solid					Client sample ID	BA2205-A-11	BA2205-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	02-Feb-2022 09:00	02-Feb-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-011	VA22A2489-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	156	215	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	356	427	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	16.5	19.6	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	6.61	6.93	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	64.0	58.7	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	4040	4400	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	3.0	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.2	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.65	8.52	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.12	6.14	---	---	---	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	---	---	---	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	---	---	---	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.96	2.14	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.139	0.177	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	2220	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.18	1.51	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.736	1.18	---	---	---	
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	146	146	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.72	0.77	---	---	---	
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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2205-A-11	BA2205-A-12	----	----	----
Client sampling date / time					02-Feb-2022 09:00	02-Feb-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A2489-011	VA22A2489-012	-----	-----	-----	
					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	73.8	38.8	----	----	----	
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	: VA22A2489	Page	: 1 of 17
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	: 08-Feb-2022 11:15
PO	: VANCO 0000051213	Issue Date	: 17-Feb-2022 12:18
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

- Anonymous:** Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

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	VA22A2489-001	BA2205-A-1	bismuth	7440-69-9	E440	30.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	cadmium	7440-43-9	E440	38.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	chromium	7440-47-3	E440	42.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	copper	7440-50-8	E440	66.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	iron	7439-89-6	E440	34.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	lead	7439-92-1	E440	72.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	manganese	7439-96-5	E440	31.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A2489-001	BA2205-A-1	nickel	7440-02-0	E440	130 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-4095310 02	----	iron	7439-89-6	E440	124 % MES	80.0-120%	Recovery greater than upper control limit
Metals	QC-MRG2-4095310 02	----	zirconium	7440-67-7	E440	121 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

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

Reference Material (RM) Sample								
Metals	QC-MRG2-4095310 03	----	potassium	7440-09-7	E440	131 % MES	70.0-130%	Recovery greater than upper control limit
Metals	QC-MRG2-4095310 03	----	titanium	7440-32-6	E440	137 % MES	70.0-130%	Recovery greater than upper control limit



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
---------------	----------------------	----------------------	---------	------------	--------	--------	--------	---------

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2205-A-3	E440.Ag	02-Feb-2022	16-Feb-2022	----	----		16-Feb-2022	----	14 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-1	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-10	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-11	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-12	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-2	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-3	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-4	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-5	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-6	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-7	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-8	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2205-A-9	E510	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2205-A-1	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2205-A-10	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2205-A-11	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-12	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-2	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-3	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-4	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-5	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-6	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-7	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-8	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2205-A-9	E440	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	180 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		
				Rec	Actual			Rec	Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-1	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-10	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-11	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-12	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-2	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-3	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-4	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-5	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2205-A-6	E144	02-Feb-2022	----	----	----		14-Feb-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 BA2205-A-7	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2205-A-8	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2205-A-9	E144	02-Feb-2022	----	----	----		14-Feb-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-1	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-10	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-11	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-12	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-2	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-3	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-4	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-5	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-6	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-7	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-8	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2205-A-9	E108	02-Feb-2022	15-Feb-2022	----	----		15-Feb-2022	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-1	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-10	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-11	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-12	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-2	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-3	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-4	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-5	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-6	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-7	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-8	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2205-A-9	E512	12-Feb-2022	----	----	----		14-Feb-2022	28 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-1	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-10	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-11	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-12	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-2	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-3	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-4	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-5	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2205-A-6	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2205-A-7	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2205-A-8	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2205-A-9	E444	12-Feb-2022	----	----	----		14-Feb-2022	180 days	12 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-1	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-10	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-11	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-12	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-2	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-3	EPP444	02-Feb-2022	12-Feb-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) BA2205-A-4	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-5	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-6	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-7	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-8	EPP444	02-Feb-2022	12-Feb-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2205-A-9	EPP444	02-Feb-2022	12-Feb-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	409531	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	409532	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	409534	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	409533	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	411640	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	409531	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	409532	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	409534	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	409533	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	411640	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	409424	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	409531	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	409425	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	409532	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	409534	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	409424	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	409425	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. Elemental Sulfur may be poorly recovered by this method. 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 : VA22A2489

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 : 08-Feb-2022 11:15
Date Analysis Commenced : 12-Feb-2022
Issue Date : 17-Feb-2022 12:20

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Caleb Deroche (Lab Analyst, Metals), Dee Lee (Analyst, Metals), Kevin Duarte (Supervisor - Metals ICP Instrumentation, Metals), and Ophelia Chiu (Department Manager - Organics, Organics).

Page : 2 of 11
Work Order : VA22A2489
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: 409533)											
VA22A2489-001	BA2205-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	0.2%	5%	----
Physical Tests (QC Lot: 409534)											
VA22A2489-001	BA2205-A-1	moisture	----	E144	0.25	%	21.9	24.5	11.2%	20%	----
Metals (QC Lot: 409531)											
VA22A2489-001	BA2205-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0531	0.0031	Diff <2x LOR	----
Metals (QC Lot: 409532)											
VA22A2489-001	BA2205-A-1	aluminum	7429-90-5	E440	50	mg/kg	41300	40100	3.10%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	141	186	27.6%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	21.4	22.0	2.86%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	693	522	28.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.51	0.51	0.006	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	12.7	17.2	30.4%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	187	228	19.6%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	13.1	19.4	38.6%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	178000	187000	5.19%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	299	195	42.3%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	160	204	24.2%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	3730	7400	66.0%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	106000	75300	34.3%	30%	DUP-H
		lead	7439-92-1	E440	0.50	mg/kg	540	1160	72.6%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	31.1	35.8	14.0%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	15200	14500	4.60%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1670	1210	31.5%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	39.3	33.6	15.6%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	288	1350	130%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	16500	17600	6.58%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5920	6240	5.11%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.47	0.41	0.06	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	7.76	6.02	25.2%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	19400	20300	4.06%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	531	449	16.8%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 409532) - continued											
VA22A2489-001	BA2205-A-1	sulfur	7704-34-9	E440	1000	mg/kg	14900	17200	14.4%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.090	0.085	0.005	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	202	215	6.26%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	346	253	31.1%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	17.6	17.3	1.98%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	7.98	8.65	8.04%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	66.2	68.2	3.06%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4700	6340	29.7%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.8	3.3	1.5	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 409534)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 409531)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 409532)						
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: 409532) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 411640)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 409424)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 409425)						
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: 409533)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 409534)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 409531)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 409532)									
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	120	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	115	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	119	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	116	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	108	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	115	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	112	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	117	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	114	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	# 124	80.0	120	MES
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	109	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	110	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	114	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	112	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	115	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	110	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	112	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	119	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	112	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	100	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	112	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	109	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	110	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: 409532) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	113	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	111	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	113	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	119	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	114	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	112	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	# 121	80.0	120	MES
Metals (QCLot: 411640)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	90.8	80.0	120	----

Qualifiers

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



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 409424)										
VA22A2489-001	BA2205-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	97.4	50.0	140	----
TCLP Metals (QCLot: 409425)										
VA22A2489-001	BA2205-A-1	antimony, TCLP	7440-36-0	E444	5.4 mg/L	5 mg/L	108	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		barium, TCLP	7440-39-3	E444	14.0 mg/L	12.5 mg/L	112	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.237 mg/L	0.25 mg/L	94.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.84 mg/L	10 mg/L	98.4	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.227 mg/L	0.25 mg/L	90.7	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	1.25 mg/L	1.25 mg/L	100	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	2.31 mg/L	2.5 mg/L	92.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	249 mg/L	250 mg/L	99.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.86 mg/L	10 mg/L	98.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	256 mg/L	250 mg/L	102	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.30 mg/L	2.5 mg/L	91.9	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.04 mg/L	5 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.109 mg/L	0.1 mg/L	109	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.1	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.04 mg/L	5 mg/L	101	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	102	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	92.0	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 409531)									
QC-409531-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	105	70.0	130	----
Metals (QCLot: 409532)									
QC-409532-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	118	70.0	130	----
QC-409532-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	124	70.0	130	----
QC-409532-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	119	70.0	130	----
QC-409532-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	124	70.0	130	----
QC-409532-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	121	70.0	130	----
QC-409532-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	140	40.0	160	----
QC-409532-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	129	70.0	130	----
QC-409532-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	114	70.0	130	----
QC-409532-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	128	70.0	130	----
QC-409532-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	117	70.0	130	----
QC-409532-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	116	70.0	130	----
QC-409532-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	120	70.0	130	----
QC-409532-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	114	70.0	130	----
QC-409532-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	113	70.0	130	----
QC-409532-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	118	70.0	130	----
QC-409532-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	123	70.0	130	----
QC-409532-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	128	70.0	130	----
QC-409532-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	115	70.0	130	----
QC-409532-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	116	70.0	130	----
QC-409532-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	# 131	70.0	130	MES
QC-409532-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	123	70.0	130	----
QC-409532-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	115	70.0	130	----
QC-409532-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	116	40.0	160	----
QC-409532-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	126	70.0	130	----
QC-409532-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	# 137	70.0	130	MES
QC-409532-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	130	70.0	130	----
QC-409532-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	122	70.0	130	----



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: 409532) - continued									
QC-409532-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	116	70.0	130	----
QC-409532-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	128	70.0	130	----

Qualifiers

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



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

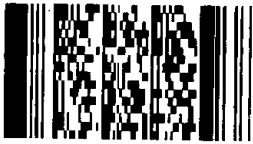
www.alsglobal.com

COC # _____

Page ____ of ____

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
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:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT
			brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

Invoice To		Client / Project Information		Analysis Request							
Same as Report ?		Job #:		Please indicate below Filtered, Preserved or both (F, P, F/P)							
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite		MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR-FULL-VA (all metals)				Number of Containers
Company:		LSD: (includes 2:1 pH)									
Contact:		Quote #:									
Address:											
Phone:		Fax:									
Lab Work Order # (lab use only)		ALS Contact:		Sampler:							

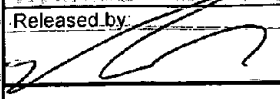
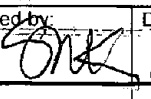
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR-FULL-VA (all metals)					Number of Containers
BA2205-A-1	Environmental Division Vancouver Work Order Reference VA22A2489  Telephone : +1 604 253 4186	02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-2		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-3		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-4		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-5		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-6		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-7		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-8		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-9		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-10		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-11		02-Feb-22	9:00	Soil	X	X		X					1
BA2205-A-12	02-Feb-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)			Observations: Yes / No ? If Yes add SIF
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:
	8 Feb 22	0800		Feb 08/2021	15	18 °C			