

Bottom Ash Data

2022 Week 7

The following analytical report represents bottom ash composite results for week 7 of 2022 (February 13, 2022 to February 19, 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 : **VA22A3625**
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 : 22-Feb-2022 11:45
Date Analysis Commenced : 01-Mar-2022
Issue Date : 08-Mar-2022 10:02

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
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	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/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2207-A-1	BA2207-A-2	BA2207-A-3	BA2207-A-4	BA2207-A-5
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-001	VA22A3625-002	VA22A3625-003	VA22A3625-004	VA22A3625-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	21.9	23.6	23.4	21.7	22.4
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.6	10.9	10.6	10.7
Metals									
aluminum	7429-90-5	E440	50	mg/kg	39400	32800	40700	34600	28100
antimony	7440-36-0	E440	0.10	mg/kg	120	136	120	145	108
arsenic	7440-38-2	E440	0.10	mg/kg	18.9	23.2	19.0	16.7	16.3
barium	7440-39-3	E440	0.50	mg/kg	572	467	470	519	433
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.82	0.38	0.39	0.31
bismuth	7440-69-9	E440	0.20	mg/kg	16.3	8.71	6.00	6.80	7.28
boron	7440-42-8	E440	5.0	mg/kg	189	189	166	169	200
cadmium	7440-43-9	E440	0.020	mg/kg	37.2	21.7	18.0	15.6	16.7
calcium	7440-70-2	E440	50	mg/kg	140000	138000	126000	126000	118000
chromium	7440-47-3	E440	0.50	mg/kg	179	572	180	505	166
cobalt	7440-48-4	E440	0.10	mg/kg	52.7	80.4	377	85.2	61.8
copper	7440-50-8	E440	0.50	mg/kg	7850	5530	8760	1320	7100
iron	7439-89-6	E440	50	mg/kg	65000	66100	74500	59500	53600
lead	7439-92-1	E440	0.50	mg/kg	494	631	366	1940	770
lithium	7439-93-2	E440	2.0	mg/kg	23.8	26.0	30.7	18.9	18.3
magnesium	7439-95-4	E440	20	mg/kg	13000	12200	11400	13600	11900
manganese	7439-96-5	E440	1.0	mg/kg	811	956	853	878	825
mercury	7439-97-6	E510	0.0500	mg/kg	0.0905	0.0894	0.0626	0.0598	0.213
molybdenum	7439-98-7	E440	0.10	mg/kg	40.3	42.9	32.4	32.0	34.8
nickel	7440-02-0	E440	0.50	mg/kg	186	340	178	347	263
phosphorus	7723-14-0	E440	50	mg/kg	11500	12300	10200	10800	10700
potassium	7440-09-7	E440	100	mg/kg	5470	5450	5090	4830	4760
selenium	7782-49-2	E440	0.20	mg/kg	0.97	0.36	0.39	0.30	0.30
silver	7440-22-4	E440.Ag	0.10	mg/kg	5.27	5.82	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	----	----	5.49	5.93	5.44
sodium	7440-23-5	E440	50	mg/kg	17800	16800	15700	15800	13700
strontium	7440-24-6	E440	0.50	mg/kg	340	340	319	339	282



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2207-A-1	BA2207-A-2	BA2207-A-3	BA2207-A-4	BA2207-A-5
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-001	VA22A3625-002	VA22A3625-003	VA22A3625-004	VA22A3625-005
					Result	Result	Result	Result	Result
Metals									
sulfur	7704-34-9	E440	1000	mg/kg	13600	14600	11300	11000	11700
thallium	7440-28-0	E440	0.050	mg/kg	0.113	0.059	0.051	0.052	0.069
tin	7440-31-5	E440	2.0	mg/kg	108	134	108	92.3	158
titanium	7440-32-6	E440	1.0	mg/kg	723	546	746	709	415
tungsten	7440-33-7	E440	0.50	mg/kg	28.5	21.8	19.7	31.4	21.8
uranium	7440-61-1	E440	0.050	mg/kg	6.61	6.36	5.56	5.48	5.73
vanadium	7440-62-2	E440	0.20	mg/kg	51.7	52.7	55.0	46.0	42.3
zinc	7440-66-6	E440	2.0	mg/kg	8090	4280	3120	3410	3100
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.8	2.4	1.6	1.8
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.3	11.2	11.3	11.6
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.53	8.51	8.69	8.66	8.89
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86
pH, TCLP final	----	EPP444	0.010	pH units	6.36	6.27	6.29	6.22	6.30
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	2.00	2.09	1.97	1.96	1.87
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.258	0.379	0.254	2.15	0.313
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	1940	2000	1920	1990
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.14	0.954	1.05	1.02	1.83
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.607	1.17	0.424	0.756	0.729
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	142	140	138	141	141
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	0.53	0.54	0.60	0.64	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	BA2207-A-1	BA2207-A-2	BA2207-A-3	BA2207-A-4	BA2207-A-5
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-001	VA22A3625-002	VA22A3625-003	VA22A3625-004	VA22A3625-005	
					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	27.4	29.5	24.5	35.0	33.1	
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)

					BA2207-A-6	BA2207-A-7	BA2207-A-8	BA2207-A-9	BA2207-A-10
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-006	VA22A3625-007	VA22A3625-008	VA22A3625-009	VA22A3625-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	22.5	23.1	22.1	22.6	23.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.8	10.8	10.7	10.8
Metals									
aluminum	7429-90-5	E440	50	mg/kg	32500	33200	37100	38500	32200
antimony	7440-36-0	E440	0.10	mg/kg	130	120	129	121	125
arsenic	7440-38-2	E440	0.10	mg/kg	18.0	28.2	19.1	20.2	23.0
barium	7440-39-3	E440	0.50	mg/kg	334	633	562	557	536
beryllium	7440-41-7	E440	0.10	mg/kg	0.32	0.43	0.42	0.40	0.41
bismuth	7440-69-9	E440	0.20	mg/kg	6.95	6.57	7.86	7.38	6.40
boron	7440-42-8	E440	5.0	mg/kg	182	249	244	192	297
cadmium	7440-43-9	E440	0.020	mg/kg	21.7	22.8	19.6	41.8	20.6
calcium	7440-70-2	E440	50	mg/kg	117000	139000	146000	141000	129000
chromium	7440-47-3	E440	0.50	mg/kg	533	407	208	166	172
cobalt	7440-48-4	E440	0.10	mg/kg	62.6	157	64.2	77.0	47.1
copper	7440-50-8	E440	0.50	mg/kg	13500	2840	2500	1720	1750
iron	7439-89-6	E440	50	mg/kg	78600	69100	56500	61100	67400
lead	7439-92-1	E440	0.50	mg/kg	583	692	347	344	1170
lithium	7439-93-2	E440	2.0	mg/kg	20.8	22.5	41.3	23.6	22.2
magnesium	7439-95-4	E440	20	mg/kg	11500	11800	12800	12700	13400
manganese	7439-96-5	E440	1.0	mg/kg	1080	900	818	894	896
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.126	0.0864	0.0647	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	87.3	38.1	38.7	35.6	31.9
nickel	7440-02-0	E440	0.50	mg/kg	895	217	188	160	288
phosphorus	7723-14-0	E440	50	mg/kg	11400	10400	13200	12600	10900
potassium	7440-09-7	E440	100	mg/kg	4790	5300	5690	5420	5440
selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.42	0.39	0.38	0.33
silver	7440-22-4	E440.Ag	0.10	mg/kg	5.57	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	----	13.1	17.2	5.61	4.65
sodium	7440-23-5	E440	50	mg/kg	14200	16500	17500	17400	17300
strontium	7440-24-6	E440	0.50	mg/kg	340	347	342	352	306
sulfur	7704-34-9	E440	1000	mg/kg	11500	12700	14500	13600	11900



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2207-A-6	BA2207-A-7	BA2207-A-8	BA2207-A-9	BA2207-A-10
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-006	VA22A3625-007	VA22A3625-008	VA22A3625-009	VA22A3625-010
					Result	Result	Result	Result	Result
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	0.078	0.060	0.068	0.071	0.058
tin	7440-31-5	E440	2.0	mg/kg	129	234	115	149	116
titanium	7440-32-6	E440	1.0	mg/kg	542	572	512	532	528
tungsten	7440-33-7	E440	0.50	mg/kg	29.4	18.6	23.8	25.2	31.2
uranium	7440-61-1	E440	0.050	mg/kg	5.27	6.30	6.83	6.43	5.79
vanadium	7440-62-2	E440	0.20	mg/kg	46.4	49.2	51.5	50.3	46.7
zinc	7440-66-6	E440	2.0	mg/kg	7980	3510	4360	4270	3260
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	1.6	1.7	1.8	1.7
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.5	11.6	11.7	11.6
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.01	9.79	9.41	9.50	9.40
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86
pH, TCLP final	----	EPP444	0.010	pH units	6.24	6.31	6.35	6.41	6.42
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	2.00	3.05	2.24	1.94	1.95
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.994	0.420	0.295	0.249	0.396
calcium, TCLP	7440-70-2	E444	10	mg/L	1960	2060	1990	1940	1940
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	1.30	1.33	1.42	1.16	0.855
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.133	0.893	0.794	0.403	0.486
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	147	143	144	145	141
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	0.89	0.56	0.67	0.53	0.91
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/Solid
 (Matrix: Soil/Solid)

					Client sample ID	BA2207-A-6	BA2207-A-7	BA2207-A-8	BA2207-A-9	BA2207-A-10
					Client sampling date / time	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00	16-Feb-2022 09:00
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-006	VA22A3625-007	VA22A3625-008	VA22A3625-009	VA22A3625-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<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	30.3	42.5	35.3	24.4	27.0	
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	BA2207-A-11	BA2207-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	16-Feb-2022 09:00	16-Feb-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-011	VA22A3625-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	23.2	21.6	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.9	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31600	38300	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	107	110	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	19.6	42.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	420	489	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.41	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.82	7.55	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	170	220	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	20.4	14.5	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	125000	138000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	188	178	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	122	62.8	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2680	2410	----	----	----	
iron	7439-89-6	E440	50	mg/kg	74900	73800	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	556	630	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	25.6	21.7	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12800	13700	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1000	933	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0752	0.0619	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	32.1	30.8	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	186	139	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11100	11200	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5280	5320	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.35	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	8.68	5.77	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	16500	17400	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	336	368	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12600	12700	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.055	0.062	----	----	----	



Analytical Results

Sub-Matrix: Soil/Solid

Client sample ID

(Matrix: Soil/Solid)

					BA2207-A-11	BA2207-A-12	----	----	----
					16-Feb-2022 09:00	16-Feb-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-011	VA22A3625-012	-----	-----	-----
					Result	Result	---	---	---
Metals									
tin	7440-31-5	E440	2.0	mg/kg	99.4	218	---	---	---
titanium	7440-32-6	E440	1.0	mg/kg	530	826	---	---	---
tungsten	7440-33-7	E440	0.50	mg/kg	25.0	22.3	---	---	---
uranium	7440-61-1	E440	0.050	mg/kg	6.00	5.97	---	---	---
vanadium	7440-62-2	E440	0.20	mg/kg	47.6	52.6	---	---	---
zinc	7440-66-6	E440	2.0	mg/kg	3740	4120	---	---	---
zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	---	---	---
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	---	---	---
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.52	9.14	---	---	---
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	---	---	---
pH, TCLP final	----	EPP444	0.010	pH units	6.29	6.40	---	---	---
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	1.83	2.05	---	---	---
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.199	0.361	---	---	---
calcium, TCLP	7440-70-2	E444	10	mg/L	1830	1940	---	---	---
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.20	1.03	---	---	---
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.399	0.906	---	---	---
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	136	134	---	---	---
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.97	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/Solid (Matrix: Soil/Solid)					Client sample ID	BA2207-A-11	BA2207-A-12	----	----	----
Client sampling date / time					16-Feb-2022 09:00	16-Feb-2022 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22A3625-011	VA22A3625-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	32.9	24.9	----	----	----	
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	: VA22A3625	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 22-Feb-2022 11:45
PO	: VANCO 0000051213	Issue Date	: 08-Mar-2022 10:01
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- 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	VA22A3625-001	BA2207-A-1	bismuth	7440-69-9	E440	33.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A3625-001	BA2207-A-1	cobalt	7440-48-4	E440	68.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A3625-001	BA2207-A-1	copper	7440-50-8	E440	53.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A3625-001	BA2207-A-1	selenium	7782-49-2	E440	0.64 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA22A3625-001	BA2207-A-1	tungsten	7440-33-7	E440	47.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A3625-001	BA2207-A-1	mercury	7439-97-6	E510	0.166 % DUP-H	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

Result Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.

Reference Material (RM) Sample

Metals	QC-MRG2-4232500 03	----	antimony	7440-36-0	E440	136 % MES	70.0-130%	Recovery greater than upper control limit
--------	-----------------------	------	----------	-----------	------	-----------	-----------	---

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2207-A-1	E440.Ag	16-Feb-2022	07-Mar-2022	----	----		07-Mar-2022	----	19 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2207-A-2	E440.Ag	16-Feb-2022	07-Mar-2022	----	----		07-Mar-2022	----	19 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2207-A-6	E440.Ag	16-Feb-2022	07-Mar-2022	----	----		07-Mar-2022	----	19 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2207-A-1	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2207-A-10	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2207-A-11	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2207-A-12	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 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 BA2207-A-2	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-3	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-4	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-5	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-6	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-7	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-8	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2207-A-9	E510	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	28 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2207-A-1	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 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 BA2207-A-10	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-11	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-12	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-2	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-3	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-4	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-5	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-6	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2207-A-7	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 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 ICPMS											
LDPE bag BA2207-A-8	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2207-A-9	E440	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	180 days	17 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-1	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-10	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-11	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-12	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-2	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-3	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-4	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-5	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-6	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-7	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-8	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2207-A-9	E144	16-Feb-2022	----	----	----		03-Mar-2022	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-1	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-10	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-11	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-12	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 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 BA2207-A-2	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-3	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-4	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-5	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-6	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-7	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-8	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2207-A-9	E108	16-Feb-2022	04-Mar-2022	----	----		05-Mar-2022	30 days	17 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-1	E512	01-Mar-2022	----	----	----		02-Mar-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) BA2207-A-10	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-11	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-12	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-2	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-3	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-4	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-5	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-6	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-7	E512	01-Mar-2022	----	----	----		02-Mar-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) BA2207-A-8	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2207-A-9	E512	01-Mar-2022	----	----	----		02-Mar-2022	28 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-1	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-10	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-11	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-12	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-2	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-3	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2207-A-4	E444	01-Mar-2022	----	----	----		02-Mar-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) BA2207-A-5	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2207-A-6	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2207-A-7	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2207-A-8	E444	01-Mar-2022	----	----	----		02-Mar-2022	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2207-A-9	E444	01-Mar-2022	----	----	----		02-Mar-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) BA2207-A-1	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-10	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-11	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-12	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-2	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-3	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-4	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-5	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-6	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-7	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-8	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2207-A-9	EPP444	16-Feb-2022	01-Mar-2022	----	----		----	----	----	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	423250	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	423251	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	423253	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	423252	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	425948	1	3	33.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	423250	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	423251	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	423253	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	423252	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	425948	1	3	33.3	5.0	✔
Mercury by CVAAS (TCLP)	E512	421738	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	423250	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	421739	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	423251	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	423253	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	421738	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	421739	1	12	8.3	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally $20 \pm 5^\circ\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^\circ\text{C}$) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C . Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl . Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
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 : VA22A3625

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 : 22-Feb-2022 11:45
Date Analysis Commenced : 01-Mar-2022
Issue Date : 08-Mar-2022 10:00

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), Janice Leung (Supervisor - Organics Instrumentation, Organics), and Kevin Duarte (Supervisor - Metals ICP Instrumentation, Metals).

Page : 2 of 11
Work Order : VA22A3625
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: 423252)											
VA22A3625-001	BA2207-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.8	0.8%	5%	----
Physical Tests (QC Lot: 423253)											
VA22A3625-001	BA2207-A-1	moisture	----	E144	0.25	%	21.9	22.6	3.15%	20%	----
Metals (QC Lot: 423250)											
VA22A3625-001	BA2207-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.0905	# 0.257	0.166	Diff <2x LOR	DUP-H
Metals (QC Lot: 423251)											
VA22A3625-001	BA2207-A-1	aluminum	7429-90-5	E440	50	mg/kg	39400	35500	10.4%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	120	125	3.87%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	18.9	16.8	12.1%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	572	591	3.32%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.37	0.03	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	16.3	11.6	33.9%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	189	208	9.66%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	37.2	41.6	11.0%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	140000	128000	8.61%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	179	218	19.8%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	52.7	107	68.0%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	7850	4540	53.5%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	65000	72700	11.3%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	494	381	26.0%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	23.8	20.6	14.6%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	13000	12200	6.88%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	811	936	14.3%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	40.3	34.5	15.4%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	186	174	6.51%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11500	9940	14.9%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5470	5050	7.98%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.97	# 0.33	0.64	Diff <2x LOR	DUP-H,J
		sodium	7440-23-5	E440	50	mg/kg	17800	16000	10.7%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	340	340	0.0666%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13600	12200	11.6%	30%	----



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: 423251) - continued											
VA22A3625-001	BA2207-A-1	thallium	7440-28-0	E440	0.050	mg/kg	0.113	0.067	0.046	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	108	112	4.12%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	723	738	2.12%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	28.5	17.6	47.3%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	6.61	5.61	16.3%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	51.7	46.9	9.67%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	8090	6390	23.5%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.7	0.1	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.



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: 423253)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 423250)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 423251)						
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: 423251) - 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: 425948)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 421738)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 421739)						
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: 423252)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 423253)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Metals (QCLot: 423250)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	116	80.0	120	----
Metals (QCLot: 423251)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	118	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	107	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	102	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	99.6	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	97.0	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	98.1	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	99.3	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	106	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
Metals (QCLot: 423251) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	104	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.5	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	102	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	116	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	105	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	110	80.0	120	----
Metals (QCLot: 425948)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	98.3	80.0	120	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 421738)										
VA22A3625-001	BA2207-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	96.6	50.0	140	----
TCLP Metals (QCLot: 421739)										
VA22A3625-001	BA2207-A-1	antimony, TCLP	7440-36-0	E444	5.3 mg/L	5 mg/L	106	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	99.4	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.3 mg/L	12.5 mg/L	106	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.245 mg/L	0.25 mg/L	98.1	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.94 mg/L	10 mg/L	99.4	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	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	99.7	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	239 mg/L	250 mg/L	95.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.26 mg/L	10 mg/L	92.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	251 mg/L	250 mg/L	100	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.44 mg/L	2.5 mg/L	97.5	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.94 mg/L	5 mg/L	98.7	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.112 mg/L	0.1 mg/L	112	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	92.2	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.90 mg/L	5 mg/L	98.1	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	103	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	87.6	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: 423250)									
QC-423250-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	112	70.0	130	----
Metals (QCLot: 423251)									
QC-423251-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	111	70.0	130	----
QC-423251-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	# 136	70.0	130	MES
QC-423251-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	112	70.0	130	----
QC-423251-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	108	70.0	130	----
QC-423251-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	112	70.0	130	----
QC-423251-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	127	40.0	160	----
QC-423251-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	103	70.0	130	----
QC-423251-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	104	70.0	130	----
QC-423251-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	113	70.0	130	----
QC-423251-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-423251-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	106	70.0	130	----
QC-423251-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	109	70.0	130	----
QC-423251-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	116	70.0	130	----
QC-423251-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	109	70.0	130	----
QC-423251-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
QC-423251-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	111	70.0	130	----
QC-423251-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	127	70.0	130	----
QC-423251-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-423251-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
QC-423251-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
QC-423251-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	112	70.0	130	----
QC-423251-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	112	70.0	130	----
QC-423251-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	116	40.0	160	----
QC-423251-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	105	70.0	130	----
QC-423251-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	119	70.0	130	----
QC-423251-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	126	70.0	130	----
QC-423251-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	112	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: 423251) - continued									
QC-423251-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	105	70.0	130	----
QC-423251-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	107	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).



ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

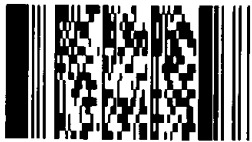
www.alsglobal.com

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	Email 1:	smckinney@covanta.com		
	Burnaby BC	Email 2:	rjohnson4@covanta.com		
Phone:	604-521-1025	Fax:	Email 3: dskrypnik@covanta.com		
	<input type="checkbox"/> Yes <input type="checkbox"/> No		brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

Invoice To Same as Report ?		Client / Project Information		Analysis Request	
Hardcopy of Invoice with Report?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Job #:	Please indicate below Filtered, Preserved or both (F, P, F/P)		
Company:		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite			
Contact:		LSD: (includes 2:1 pH)			
Address:		Quote #:			
Phone:					

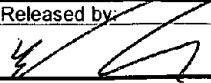
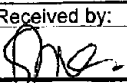
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ALS Contact:	Sampler:	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)	Number of Containers
BA2207-A-1	Environmental Division Vancouver Work Order Reference VA22A3625  Telephone: +1 604 253 4188	16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-2		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-3		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-4		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-5		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-6		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-7		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-8		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-9		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-10		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-11		16-Feb-22	9:00	Soil			X	X		X	1
BA2207-A-12		16-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)				
Released by:	Date (dd-mmm-yy)	Time (hh:mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	22 Feb 2020	0800		22 Feb 2020	11:45	14 °C				