Bottom Ash Data

2022 Week 1

The following analytical report represents bottom ash composite results for week 1 of 2022 (January 2, 2022 to January 8, 2022).

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA22A0403**	Page	: 1 of 11
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 11-Jan-2022 12:40
PO	: VANCO 0000051213	Date Analysis Commenced	: 13-Jan-2022
C-O-C number	: ----	Issue Date	: 20-Jan-2022 10:29
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

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).

Unit	*Description*
%	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**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-1	BA2201-A-2	BA2201-A-3	BA2201-A-4	BA2201-A-5
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-001	VA22A0403-002	VA22A0403-003	VA22A0403-004	VA22A0403-005
						Result	Result	Result	Result	Result
Physical Tests										
moisture	----	E144	0.25	%		27.8	28.5	29.2	28.8	28.9
pH (1:2 soil:water)	----	E108	0.10	pH units		10.3	10.3	10.3	10.4	10.4
Metals										
aluminum	7429-90-5	E440	50	mg/kg		38500	35200	39400	31800	41000
antimony	7440-36-0	E440	0.10	mg/kg		121	129	130	126	103
arsenic	7440-38-2	E440	0.10	mg/kg		20.3	20.6	20.7	18.8	16.5
barium	7440-39-3	E440	0.50	mg/kg		615	666	614	532	641
beryllium	7440-41-7	E440	0.10	mg/kg		0.37	0.42	0.38	0.35	0.34
bismuth	7440-69-9	E440	0.20	mg/kg		65.6	56.9	79.2	56.4	65.8
boron	7440-42-8	E440	5.0	mg/kg		178	190	201	353	196
cadmium	7440-43-9	E440	0.020	mg/kg		10.4	15.7	10.4	11.1	8.78
calcium	7440-70-2	E440	50	mg/kg		144000	153000	146000	149000	137000
chromium	7440-47-3	E440	0.50	mg/kg		175	186	164	437	154
cobalt	7440-48-4	E440	0.10	mg/kg		49.2	216	125	90.4	87.4
copper	7440-50-8	E440	0.50	mg/kg		2590	1730	2350	2120	1780
iron	7439-89-6	E440	50	mg/kg		47800	47400	42000	71100	47300
lead	7439-92-1	E440	0.50	mg/kg		478	1360	492	378	421
lithium	7439-93-2	E440	2.0	mg/kg		26.3	45.2	40.1	27.3	23.8
magnesium	7439-95-4	E440	20	mg/kg		14300	13800	13100	12800	14100
manganese	7439-96-5	E440	1.0	mg/kg		944	833	771	800	883
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	26.1	28.6	35.5	31.4
nickel	7440-02-0	E440	0.50	mg/kg		145	216	149	398	89.6
phosphorus	7723-14-0	E440	50	mg/kg		13400	15100	14400	13900	12200
potassium	7440-09-7	E440	100	mg/kg		5530	5850	5870	5040	5120
selenium	7782-49-2	E440	0.20	mg/kg		0.52	0.45	0.32	0.42	0.28
silver	7440-22-4	E440	0.10	mg/kg		10.7	5.43	5.11	6.03	4.76
sodium	7440-23-5	E440	50	mg/kg		16900	17900	17900	15700	16300
strontium	7440-24-6	E440	0.50	mg/kg		336	369	341	346	385
sulfur	7704-34-9	E440	1000	mg/kg		13200	13800	13100	13600	11000

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-1	BA2201-A-2	BA2201-A-3	BA2201-A-4	BA2201-A-5
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-001	VA22A0403-002	VA22A0403-003	VA22A0403-004	VA22A0403-005
						Result	Result	Result	Result	Result
Metals										
thallium	7440-28-0	E440	0.050	mg/kg		0.069	0.070	0.057	0.062	0.056
tin	7440-31-5	E440	2.0	mg/kg		141	228	124	128	115
titanium	7440-32-6	E440	1.0	mg/kg		512	474	443	385	484
tungsten	7440-33-7	E440	0.50	mg/kg		13.2	13.8	12.4	19.1	10.1
uranium	7440-61-1	E440	0.050	mg/kg		5.64	6.30	5.64	5.92	4.95
vanadium	7440-62-2	E440	0.20	mg/kg		49.6	50.9	54.0	65.5	43.6
zinc	7440-66-6	E440	2.0	mg/kg		4280	3550	4940	3990	3000
zirconium	7440-67-7	E440	1.0	mg/kg		2.7	2.5	3.2	3.1	3.6
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.2	11.2	11.1	11.4	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		9.00	8.85	8.29	8.70	8.22
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units		2.88	2.88	2.88	2.88	2.88
pH, TCLP final	----	EPP444	0.010	pH units		6.46	6.49	6.47	5.66	5.74
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		2.02	2.12	2.25	2.22	2.34
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.153	0.124	0.122	0.155	0.167
calcium, TCLP	7440-70-2	E444	10	mg/L		1770	1830	1980	2180	2160
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		0.907	1.33	0.662	1.02	1.35
copper, TCLP	7440-50-8	E444	0.050	mg/L		1.02	0.750	1.25	2.09	1.44
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		0.31	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L		127	118	132	149	158
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		0.39	0.31	0.35	0.63	0.74
selenium, TCLP	7782-49-2	E444	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
silver, TCLP	7440-22-4	E444	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-1	BA2201-A-2	BA2201-A-3	BA2201-A-4	BA2201-A-5
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-001	VA22A0403-002	VA22A0403-003	VA22A0403-004	VA22A0403-005
						Result	Result	Result	Result	Result
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L		<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L		42.4	19.0	35.5	64.5	84.4
zirconium, TCLP	7440-67-7	E444	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-6	BA2201-A-7	BA2201-A-8	BA2201-A-9	BA2201-A-10
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-006	VA22A0403-007	VA22A0403-008	VA22A0403-009	VA22A0403-010
						Result	Result	Result	Result	Result
Physical Tests										
moisture	----	E144	0.25	%		28.4	29.3	27.1	28.3	27.5
pH (1:2 soil:water)	----	E108	0.10	pH units		10.4	10.4	10.5	10.5	10.4
Metals										
aluminum	7429-90-5	E440	50	mg/kg		37600	50800	40100	52100	57000
antimony	7440-36-0	E440	0.10	mg/kg		123	98.1	129	115	132
arsenic	7440-38-2	E440	0.10	mg/kg		16.3	18.4	17.6	21.1	17.9
barium	7440-39-3	E440	0.50	mg/kg		603	639	665	648	679
beryllium	7440-41-7	E440	0.10	mg/kg		0.37	0.37	0.41	0.36	0.47
bismuth	7440-69-9	E440	0.20	mg/kg		60.6	42.6	60.4	136	51.3
boron	7440-42-8	E440	5.0	mg/kg		203	163	199	185	223
cadmium	7440-43-9	E440	0.020	mg/kg		12.2	9.69	10.9	9.46	12.9
calcium	7440-70-2	E440	50	mg/kg		143000	129000	154000	123000	147000
chromium	7440-47-3	E440	0.50	mg/kg		176	138	157	296	171
cobalt	7440-48-4	E440	0.10	mg/kg		60.9	84.3	190	45.9	107
copper	7440-50-8	E440	0.50	mg/kg		1710	2120	2830	6750	3330
iron	7439-89-6	E440	50	mg/kg		45200	64400	59900	41000	53500
lead	7439-92-1	E440	0.50	mg/kg		1120	322	686	436	340
lithium	7439-93-2	E440	2.0	mg/kg		27.9	29.7	33.3	22.0	32.3
magnesium	7439-95-4	E440	20	mg/kg		13000	12200	12500	12000	13000
manganese	7439-96-5	E440	1.0	mg/kg		1000	959	768	964	1470
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		26.7	48.1	637	34.8	29.1
nickel	7440-02-0	E440	0.50	mg/kg		144	127	173	238	267
phosphorus	7723-14-0	E440	50	mg/kg		14000	11600	14900	12400	16500
potassium	7440-09-7	E440	100	mg/kg		5520	4830	5030	5370	5690
selenium	7782-49-2	E440	0.20	mg/kg		0.35	0.32	0.45	0.41	0.40
silver	7440-22-4	E440	0.10	mg/kg		5.17	6.22	23.9	5.14	12.4
sodium	7440-23-5	E440	50	mg/kg		17300	14900	15900	16400	18300
strontium	7440-24-6	E440	0.50	mg/kg		349	308	363	298	375
sulfur	7704-34-9	E440	1000	mg/kg		12600	10700	12600	12100	12300
thallium	7440-28-0	E440	0.050	mg/kg		0.065	0.054	0.062	0.062	0.057

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-6	BA2201-A-7	BA2201-A-8	BA2201-A-9	BA2201-A-10
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-006	VA22A0403-007	VA22A0403-008	VA22A0403-009	VA22A0403-010
						Result	Result	Result	Result	Result
Metals										
tin	7440-31-5	E440	2.0	mg/kg		171	120	218	99.4	390
titanium	7440-32-6	E440	1.0	mg/kg		390	1040	512	1060	538
tungsten	7440-33-7	E440	0.50	mg/kg		14.2	14.3	15.6	29.9	18.5
uranium	7440-61-1	E440	0.050	mg/kg		5.77	4.91	5.83	5.26	5.61
vanadium	7440-62-2	E440	0.20	mg/kg		53.2	42.5	56.9	46.7	59.3
zinc	7440-66-6	E440	2.0	mg/kg		3490	3030	3920	2810	3480
zirconium	7440-67-7	E440	1.0	mg/kg		2.8	3.7	2.9	4.0	3.4
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.4	11.4	11.2	11.3	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		8.74	8.53	8.49	8.34	8.45
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units		2.88	2.88	2.88	2.88	2.88
pH, TCLP final	----	EPP444	0.010	pH units		6.45	6.54	5.67	6.31	6.14
antimony, TCLP	7440-36-0	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L		<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L		<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L		2.24	2.10	2.34	2.18	2.46
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.090	0.086	0.185	0.241	0.151
calcium, TCLP	7440-70-2	E444	10	mg/L		1820	1850	2190	1930	1910
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		3.77	0.687	0.995	1.30	0.818
copper, TCLP	7440-50-8	E444	0.050	mg/L		0.740	0.630	0.971	0.715	0.967
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	0.30	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L		123	117	153	127	136
mercury, TCLP	7439-97-6	E512	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
nickel, TCLP	7440-02-0	E444	0.25	mg/L		0.29	0.27	0.62	0.59	0.39
selenium, TCLP	7782-49-2	E444	0.10	mg/L		<0.10	<0.10	<0.10	<0.10	<0.10
silver, TCLP	7440-22-4	E444	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L		<0.20	<0.20	<0.20	<0.20	<0.20

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-6	BA2201-A-7	BA2201-A-8	BA2201-A-9	BA2201-A-10
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00	05-Jan-2022 09:00
						VA22A0403-006	VA22A0403-007	VA22A0403-008	VA22A0403-009	VA22A0403-010
						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
zinc, TCLP	7440-66-6	E444	0.50	mg/L		15.0	19.4	78.0	58.2	33.2
zirconium, TCLP	7440-67-7	E444	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-11	BA2201-A-12	----	----	----
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	----	----	----
						VA22A0403-011	VA22A0403-012	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
moisture	----	E144	0.25	%		29.5	29.1	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		10.3	10.3	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		35500	36600	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		140	112	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		25.2	18.6	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		663	569	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		0.37	0.36	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		42.0	303	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		175	160	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		10.8	19.1	----	----	----
calcium	7440-70-2	E440	50	mg/kg		144000	132000	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		144	169	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		46.7	383	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		2690	2840	----	----	----
iron	7439-89-6	E440	50	mg/kg		45700	60200	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		346	824	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		27.7	32.2	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		12200	13100	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		791	1410	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	<0.0500	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		33.6	32.2	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		121	242	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		16200	13200	----	----	----
potassium	7440-09-7	E440	100	mg/kg		5560	5390	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg		0.35	0.35	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		5.69	5.00	----	----	----
sodium	7440-23-5	E440	50	mg/kg		17800	17500	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		340	794	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		13200	11500	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg		0.058	0.052	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2201-A-11	BA2201-A-12	----	----	----
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	----	----	----
						VA22A0403-011	VA22A0403-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
tin	7440-31-5	E440	2.0	mg/kg		124	181	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		502	407	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		12.8	10.8	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		5.56	5.35	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		46.3	50.5	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		5490	3750	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		2.2	2.9	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.3	11.4	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		8.68	8.64	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units		2.88	2.88	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units		5.75	6.43	----	----	----
antimony, TCLP	7440-36-0	E444	1.0	mg/L		<1.0	<1.0	----	----	----
arsenic, TCLP	7440-38-2	E444	1.0	mg/L		<1.0	<1.0	----	----	----
barium, TCLP	7440-39-3	E444	2.5	mg/L		<2.5	<2.5	----	----	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L		<0.025	<0.025	----	----	----
boron, TCLP	7440-42-8	E444	0.50	mg/L		2.37	2.12	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.156	0.108	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L		2140	1960	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L		<0.25	<0.25	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L		0.980	0.964	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L		1.53	0.915	----	----	----
iron, TCLP	7439-89-6	E444	5.0	mg/L		<5.0	<5.0	----	----	----
lead, TCLP	7439-92-1	E444	0.25	mg/L		0.54	<0.25	----	----	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L		142	126	----	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L		<0.0010	<0.0010	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L		0.74	0.35	----	----	----
selenium, TCLP	7782-49-2	E444	0.10	mg/L		<0.10	<0.10	----	----	----
silver, TCLP	7440-22-4	E444	0.050	mg/L		<0.050	<0.050	----	----	----
thallium, TCLP	7440-28-0	E444	1.0	mg/L		<1.0	<1.0	----	----	----
uranium, TCLP	7440-61-1	E444	0.20	mg/L		<0.20	<0.20	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2201-A-11	BA2201-A-12	----	----	----
					Client sampling date / time	05-Jan-2022 09:00	05-Jan-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA22A0403-011	VA22A0403-012	--------	--------	--------
						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		48.0	24.0	----	----	----
zirconium, TCLP	7440-67-7	E444	10	mg/L		<10	<10	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA22A0403**	Page	: 1 of 15
Client	: **Covanta Burnaby Renewable Energy, ULC**	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 11-Jan-2022 12:40
PO	: VANCO 0000051213	Issue Date	: 20-Jan-2022 10:29
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.

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22A0403-001	BA2201-A-1	cobalt	7440-48-4	E440	39.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A0403-001	BA2201-A-1	copper	7440-50-8	E440	53.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A0403-001	BA2201-A-1	silver	7440-22-4	E440	65.5 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A0403-001	BA2201-A-1	titanium	7440-32-6	E440	41.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-1	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-10	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-11	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-12	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-2	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-3	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-4	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-5	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-6	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-7	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-8	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2201-A-9	E510	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	28 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-1	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-10	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-11	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-12	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-2	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-3	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-4	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-5	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-6	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-7	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-8	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2201-A-9	E440	05-Jan-2022	14-Jan-2022	----	----		18-Jan-2022	180 days	13 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-1	E144	05-Jan-2022	----	----	----		13-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-10	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-11	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-12	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-2	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-3	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-4	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-5	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-6	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-7	E144	05-Jan-2022	----	----	----		13-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-8	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2201-A-9	E144	05-Jan-2022	----	----	----		13-Jan-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-1	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-10	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-11	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-12	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-2	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-3	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-4	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-5	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-6	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-7	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-8	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2201-A-9	E108	05-Jan-2022	14-Jan-2022	----	----		14-Jan-2022	30 days	9 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-1	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-10	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-11	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-12	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-2	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-3	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-4	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-5	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-6	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-7	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-8	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2201-A-9	E512	15-Jan-2022	----	----	----		19-Jan-2022	----	14 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-1	E444	15-Jan-2022	----	----	----		19-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-10	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-11	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-12	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-2	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-3	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-4	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-5	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-6	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-7	E444	15-Jan-2022	----	----	----		19-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-8	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2201-A-9	E444	15-Jan-2022	----	----	----		19-Jan-2022	180 days	14 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-1	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-10	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-11	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-12	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-2	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-3	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-4	EPP444	05-Jan-2022	15-Jan-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-5	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-6	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-7	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-8	EPP444	05-Jan-2022	15-Jan-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2201-A-9	EPP444	05-Jan-2022	15-Jan-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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	386188	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	386187	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	386190	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	386189	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	386188	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	386187	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	386190	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	386189	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	389976	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	386188	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	389977	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	386187	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	386190	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	389976	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	389977	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 ºC) 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 HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°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 HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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	: **VA22A0403**	Page	: 1 of 11
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 11-Jan-2022 12:40
PO	: VANCO 0000051213	Date Analysis Commenced	: 13-Jan-2022
C-O-C number	: ----	Issue Date	: 20-Jan-2022 10:29
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

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.

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: 386189)											
VA22A0403-001	BA2201-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	0.5%	5%	----
Physical Tests (QC Lot: 386190)											
VA22A0403-001	BA2201-A-1	moisture	----	E144	0.25	%	27.8	27.4	1.74%	20%	----
Metals (QC Lot: 386187)											
VA22A0403-001	BA2201-A-1	aluminum	7429-90-5	E440	50	mg/kg	38500	34800	10.2%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	121	120	0.841%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	20.3	19.0	6.74%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	615	581	5.70%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.36	0.008	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	65.6	57.7	12.7%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	178	168	5.43%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	10.4	10.2	1.03%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	144000	136000	5.54%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	175	199	12.9%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	49.2	73.2	39.2%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	2590	4460	53.1%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	47800	52300	9.16%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	478	515	7.40%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	26.3	24.0	8.98%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	14300	13600	4.88%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	944	853	10.1%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	27.8	35.1	23.2%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	145	134	7.66%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	13400	13100	1.89%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5530	5840	5.44%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.52	0.34	0.18	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	10.7	5.44	65.5%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	16900	17100	0.868%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	336	355	5.37%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13200	12500	4.84%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.069	0.061	0.008	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 386187) - continued											
VA22A0403-001	BA2201-A-1	tin	7440-31-5	E440	2.0	mg/kg	141	161	13.2%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	512	336	41.4%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	13.2	13.7	3.35%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.64	5.44	3.62%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	49.6	47.9	3.53%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4280	4160	2.65%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.7	3.0	0.3	Diff <2x LOR	----
Metals (QC Lot: 386188)											
VA22A0403-001	BA2201-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0511	0.0011	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: 386190)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 386187)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 386187) - continued						
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 386188)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
TCLP Metals (QCLot: 389976)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 389977)						
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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 386189)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 386190)									
moisture	----	E144	0.25	%	50 %	99.6	90.0	110	----
Metals (QCLot: 386187)									
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	108	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	93.3	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	99.0	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	93.2	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	97.6	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	94.2	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.0	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.8	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	99.5	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	94.3	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	91.6	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.5	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	89.5	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	91.4	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	98.3	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	100	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.3	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 386187) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	106	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Metals (QCLot: 386188)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	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: 389976)										
VA22A0403-001	BA2201-A-1	mercury, TCLP	7439-97-6	E512	0.0011 mg/L	0.001 mg/L	107	50.0	140	----
TCLP Metals (QCLot: 389977)										
VA22A0403-001	BA2201-A-1	antimony, TCLP	7440-36-0	E444	5.6 mg/L	5 mg/L	112	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	101	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.2 mg/L	12.5 mg/L	106	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.266 mg/L	0.25 mg/L	106	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.7 mg/L	10 mg/L	107	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.251 mg/L	0.25 mg/L	100	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	1.26 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	2.37 mg/L	2.5 mg/L	94.9	50.0	140	----
		iron, TCLP	7439-89-6	E444	246 mg/L	250 mg/L	98.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.5 mg/L	10 mg/L	105	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	234 mg/L	250 mg/L	93.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.47 mg/L	2.5 mg/L	98.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.86 mg/L	5 mg/L	97.2	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.115 mg/L	0.1 mg/L	115	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	100	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.22 mg/L	5 mg/L	104	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.76 mg/L	0.75 mg/L	101	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	10 mg/L	10 mg/L	95.7	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**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 386187)									
QC-386187-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	99.6	70.0	130	----
QC-386187-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	98.6	70.0	130	----
QC-386187-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	102	70.0	130	----
QC-386187-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	99.9	70.0	130	----
QC-386187-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	92.1	70.0	130	----
QC-386187-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	112	40.0	160	----
QC-386187-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	109	70.0	130	----
QC-386187-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	94.3	70.0	130	----
QC-386187-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	103	70.0	130	----
QC-386187-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	102	70.0	130	----
QC-386187-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	101	70.0	130	----
QC-386187-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	100	70.0	130	----
QC-386187-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.4	70.0	130	----
QC-386187-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	97.9	70.0	130	----
QC-386187-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
QC-386187-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	104	70.0	130	----
QC-386187-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
QC-386187-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-386187-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	93.3	70.0	130	----
QC-386187-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	101	70.0	130	----
QC-386187-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	97.2	70.0	130	----
QC-386187-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	99.4	70.0	130	----
QC-386187-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	97.4	40.0	160	----
QC-386187-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	99.7	70.0	130	----
QC-386187-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	106	70.0	130	----
QC-386187-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	102	70.0	130	----
QC-386187-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	104	70.0	130	----
QC-386187-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-386187-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	98.5	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 386188)									
QC-386188-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	96.8	70.0	130	----

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			☐ Standard ☐ Other				◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Steve Mckinney / Dan Skrypnyk			☑ PDF	☐ Excel	☐ Digital	☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	5150 Riverbend Drive			Email 1:	smckinney@covanta.com			○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Burnaby BC			Email 2:	rjohnson4@covanta.com			○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604-521-1025	Fax:		Email 3:	dskrypnyk@covanta.com			Analysis Request
		☐ Yes	☐ No		brent.kirkpatrick@metrovancouver.org			
					Sarah.Wellman@metrovancouver.org			
Invoice To	Same as Report ?			Client / Project Information				Please indicate below Filtered, Preserved or both (F, P, F/P)
Hardcopy of Invoice with Report?		☐ Yes	☐ No	Job #:				
Company:				PO / AFE:	PO# 46693 Weekly Bottom Ash - Suite			
Contact:				LSD:	(includes 2:1 pH)			
Address:								
Phone:		Fax:		Quote #:				
Lab Work Order # (lab use only)		0403		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
	BA2201-A-1	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-2	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-3	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-4	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-5	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-6	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-7	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-8	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-9	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-10	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-11	05-Jan-22	9:00	Soil	X	X		X	1
	BA2201-A-12	05-Jan-22	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA22A0403

Telephone : +1 604 253 4188

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	11-Jan-22	8:00				18°C	JW	Jan. 11/22	12:40	

18° no ice

GENF 20.00 Front