Bottom Ash Data

2022 Week 12

The following analytical report represents bottom ash composite results for week 12 of 2022 (March 20, 2022 to March 26, 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	: **VA22A6415**	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	: 29-Mar-2022 10:20
PO	: VANCO 0000051213	Date Analysis Commenced	: 08-Apr-2022
C-O-C number	: ----	Issue Date	: 22-Apr-2022 10:25
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	BA2212-A-1	BA2212-A-2	BA2212-A-3	BA2212-A-4	BA2212-A-5
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-001	VA22A6415-002	VA22A6415-003	VA22A6415-004	VA22A6415-005
						Result	Result	Result	Result	Result
Physical Tests										
moisture	----	E144	0.25	%		23.7	24.5	25.6	25.1	24.8
pH (1:2 soil:water)	----	E108	0.10	pH units		10.3	10.3	10.2	10.4	10.3
Metals										
aluminum	7429-90-5	E440	50	mg/kg		33100	42100	42900	38600	32300
antimony	7440-36-0	E440	0.10	mg/kg		92.1	186	286	159	149
arsenic	7440-38-2	E440	0.10	mg/kg		16.1	25.4	21.8	22.2	23.4
barium	7440-39-3	E440	0.50	mg/kg		529	428	301	281	271
beryllium	7440-41-7	E440	0.10	mg/kg		0.36	0.34	0.37	0.33	0.33
bismuth	7440-69-9	E440	0.20	mg/kg		14.8	10.2	9.55	12.1	11.4
boron	7440-42-8	E440	5.0	mg/kg		230	324	257	214	216
cadmium	7440-43-9	E440	0.020	mg/kg		7.05	11.2	13.5	12.9	13.6
calcium	7440-70-2	E440	50	mg/kg		117000	132000	142000	148000	143000
chromium	7440-47-3	E440	0.50	mg/kg		152	160	159	136	156
cobalt	7440-48-4	E440	0.10	mg/kg		39.9	62.2	27.5	33.3	29.4
copper	7440-50-8	E440	0.50	mg/kg		1470	2070	2910	2670	3640
iron	7439-89-6	E440	50	mg/kg		50400	58600	56400	49700	62300
lead	7439-92-1	E440	0.50	mg/kg		461	579	613	435	1140
lithium	7439-93-2	E440	2.0	mg/kg		17.5	27.4	21.5	19.6	21.9
magnesium	7439-95-4	E440	20	mg/kg		10300	11700	11900	12300	11500
manganese	7439-96-5	E440	1.0	mg/kg		643	1180	898	933	792
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	0.0661	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg		126	166	237	135	210
nickel	7440-02-0	E440	0.50	mg/kg		93.9	204	109	117	127
phosphorus	7723-14-0	E440	50	mg/kg		7310	9340	9890	13300	11100
potassium	7440-09-7	E440	100	mg/kg		4680	5290	6490	6340	5740
selenium	7782-49-2	E440	0.20	mg/kg		0.30	0.37	0.41	0.45	0.42
silver	7440-22-4	E440	0.10	mg/kg		8.59	7.56	10.7	6.96	12.5
sodium	7440-23-5	E440	50	mg/kg		13300	14700	17000	16900	15200
strontium	7440-24-6	E440	0.50	mg/kg		638	348	573	332	353
sulfur	7704-34-9	E440	1000	mg/kg		10200	14000	16000	17100	16200

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2212-A-1	BA2212-A-2	BA2212-A-3	BA2212-A-4	BA2212-A-5
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-001	VA22A6415-002	VA22A6415-003	VA22A6415-004	VA22A6415-005
						Result	Result	Result	Result	Result
Metals										
thallium	7440-28-0	E440	0.050	mg/kg		0.076	0.065	0.067	0.067	0.073
tin	7440-31-5	E440	2.0	mg/kg		150	223	359	668	130
titanium	7440-32-6	E440	1.0	mg/kg		712	818	713	400	380
tungsten	7440-33-7	E440	0.50	mg/kg		32.6	43.4	50.1	39.8	46.6
uranium	7440-61-1	E440	0.050	mg/kg		3.21	4.06	4.76	4.55	4.69
vanadium	7440-62-2	E440	0.20	mg/kg		49.1	41.3	42.3	41.1	49.5
zinc	7440-66-6	E440	2.0	mg/kg		10300	5340	5200	3440	4460
zirconium	7440-67-7	E440	1.0	mg/kg		1.1	1.8	2.2	3.4	1.8
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.4	11.4	11.4	11.5	11.4
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		9.07	9.35	9.10	9.40	9.10
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		6.42	6.42	6.50	6.44	6.40
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		2.06	2.19	2.39	2.24	2.22
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.154	0.243	0.156	0.216	0.361
calcium, TCLP	7440-70-2	E444	10	mg/L		2040	2100	2170	2130	2140
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		1.19	0.713	0.659	0.698	0.630
copper, TCLP	7440-50-8	E444	0.050	mg/L		0.767	0.864	0.427	0.522	0.637
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		140	140	141	132	137
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		0.60	0.43	0.57	0.49	0.44
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	BA2212-A-1	BA2212-A-2	BA2212-A-3	BA2212-A-4	BA2212-A-5
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-001	VA22A6415-002	VA22A6415-003	VA22A6415-004	VA22A6415-005
						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		41.9	55.8	28.6	30.5	32.3
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	BA2212-A-6	BA2212-A-7	BA2212-A-8	BA2212-A-9	BA2212-A-10
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-006	VA22A6415-007	VA22A6415-008	VA22A6415-009	VA22A6415-010
						Result	Result	Result	Result	Result
Physical Tests										
moisture	----	E144	0.25	%		23.4	24.7	23.1	24.8	23.2
pH (1:2 soil:water)	----	E108	0.10	pH units		10.4	10.4	10.5	10.3	10.3
Metals										
aluminum	7429-90-5	E440	50	mg/kg		40200	41800	37300	37600	37400
antimony	7440-36-0	E440	0.10	mg/kg		140	162	138	122	101
arsenic	7440-38-2	E440	0.10	mg/kg		17.5	22.3	25.9	21.1	17.4
barium	7440-39-3	E440	0.50	mg/kg		292	336	319	455	534
beryllium	7440-41-7	E440	0.10	mg/kg		0.34	0.36	0.70	0.34	0.37
bismuth	7440-69-9	E440	0.20	mg/kg		9.54	11.4	23.3	8.16	14.6
boron	7440-42-8	E440	5.0	mg/kg		162	266	282	297	259
cadmium	7440-43-9	E440	0.020	mg/kg		13.2	12.9	16.7	9.88	9.35
calcium	7440-70-2	E440	50	mg/kg		120000	156000	145000	120000	133000
chromium	7440-47-3	E440	0.50	mg/kg		180	176	166	136	308
cobalt	7440-48-4	E440	0.10	mg/kg		56.8	65.8	367	55.5	69.6
copper	7440-50-8	E440	0.50	mg/kg		16700	2450	1480	1930	4380
iron	7439-89-6	E440	50	mg/kg		43900	52800	50700	52800	52500
lead	7439-92-1	E440	0.50	mg/kg		431	420	482	337	349
lithium	7439-93-2	E440	2.0	mg/kg		19.1	21.8	26.0	20.1	38.0
magnesium	7439-95-4	E440	20	mg/kg		10600	12700	12100	10900	12600
manganese	7439-96-5	E440	1.0	mg/kg		819	824	769	700	825
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	<0.0500	<0.0500	<0.0500	0.0538
molybdenum	7439-98-7	E440	0.10	mg/kg		134	145	209	116	136
nickel	7440-02-0	E440	0.50	mg/kg		115	128	159	127	223
phosphorus	7723-14-0	E440	50	mg/kg		8410	12600	10000	8280	9500
potassium	7440-09-7	E440	100	mg/kg		5440	5980	5920	5260	5310
selenium	7782-49-2	E440	0.20	mg/kg		0.41	0.52	0.62	0.45	0.40
silver	7440-22-4	E440	0.10	mg/kg		5.56	8.36	7.65	5.52	5.16
sodium	7440-23-5	E440	50	mg/kg		13800	15300	16100	14600	15800
strontium	7440-24-6	E440	0.50	mg/kg		281	337	300	288	302
sulfur	7704-34-9	E440	1000	mg/kg		13300	16700	15900	12000	12200
thallium	7440-28-0	E440	0.050	mg/kg		0.064	0.069	0.075	0.061	0.056

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2212-A-6	BA2212-A-7	BA2212-A-8	BA2212-A-9	BA2212-A-10
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-006	VA22A6415-007	VA22A6415-008	VA22A6415-009	VA22A6415-010
						Result	Result	Result	Result	Result
Metals										
tin	7440-31-5	E440	2.0	mg/kg		95.0	149	120	113	95.1
titanium	7440-32-6	E440	1.0	mg/kg		881	413	394	917	654
tungsten	7440-33-7	E440	0.50	mg/kg		37.5	55.3	59.2	44.3	28.6
uranium	7440-61-1	E440	0.050	mg/kg		3.98	4.65	5.07	3.80	4.80
vanadium	7440-62-2	E440	0.20	mg/kg		39.8	43.3	45.1	38.4	43.1
zinc	7440-66-6	E440	2.0	mg/kg		3030	3840	3930	4960	3600
zirconium	7440-67-7	E440	1.0	mg/kg		2.3	2.0	1.5	1.2	1.4
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.4	11.4	11.4	11.5	11.5
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		9.00	8.80	9.26	9.14	9.23
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		6.20	6.31	6.38	6.56	6.53
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		2.19	2.32	2.38	2.22	2.23
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.195	0.182	0.171	0.179	0.514
calcium, TCLP	7440-70-2	E444	10	mg/L		2200	2190	2230	2120	2080
chromium, TCLP	7440-47-3	E444	0.25	mg/L		<0.25	<0.25	<0.25	<0.25	<0.25
cobalt, TCLP	7440-48-4	E444	0.050	mg/L		0.865	1.16	1.39	0.924	1.06
copper, TCLP	7440-50-8	E444	0.050	mg/L		0.823	0.920	0.825	0.539	0.957
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		143	147	153	138	144
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		0.46	1.37	0.60	0.75	0.47
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	BA2212-A-6	BA2212-A-7	BA2212-A-8	BA2212-A-9	BA2212-A-10
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00	23-Mar-2022 09:00
						VA22A6415-006	VA22A6415-007	VA22A6415-008	VA22A6415-009	VA22A6415-010
						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		43.6	37.8	40.8	46.4	27.7
zirconium, TCLP	7440-67-7	E444	10	mg/L		<10	<10	<10	<10	<10

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: BA2212-A-11	BA2212-A-12	----	----	----
					Client sampling date / time: 23-Mar-2022 09:00	23-Mar-2022 09:00	----	----	----
					VA22A6415-011	VA22A6415-012	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
moisture	----	E144	0.25	%	25.0	24.6	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.5	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	43800	32000	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	125	89.6	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	15.1	15.3	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	478	383	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.30	0.27	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	8.89	20.9	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	162	144	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	6.92	7.20	----	----	----
calcium	7440-70-2	E440	50	mg/kg	106000	114000	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	278	124	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	31.4	23.2	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	2540	1370	----	----	----
iron	7439-89-6	E440	50	mg/kg	60800	52300	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	269	282	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	18.3	14.7	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	9370	10400	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	923	593	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	199	97.6	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	137	79.6	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	7200	7130	----	----	----
potassium	7440-09-7	E440	100	mg/kg	4700	4220	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.28	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	6.85	4.96	----	----	----
sodium	7440-23-5	E440	50	mg/kg	12900	12500	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	888	286	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	11400	10300	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.067	<0.050	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BA2212-A-11	BA2212-A-12	----	----	----
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	----	----	----
						VA22A6415-011	VA22A6415-012	--------	--------	--------
						Result	Result	----	----	----
Metals										
tin	7440-31-5	E440	2.0	mg/kg		91.9	134	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		1880	791	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		30.4	20.2	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		3.03	3.22	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		33.9	32.4	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		2480	3660	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		6.4	1.5	----	----	----
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units		11.4	11.4	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units		9.16	9.14	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units		2.86	2.86	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units		6.40	6.28	----	----	----
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		2.36	2.23	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L		0.158	0.174	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L		2190	2220	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L		<0.25	<0.25	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L		0.838	0.918	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L		0.647	1.05	----	----	----
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		144	144	----	----	----
mercury, TCLP	7439-97-6	E512	0.0010	mg/L		<0.0010	<0.0010	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L		0.52	0.53	----	----	----
selenium, TCLP	7782-49-2	E444	0.10	mg/L		<0.10	<0.10	----	----	----
silver, TCLP	7440-22-4	E444	0.050	mg/L		<0.050	<0.050	----	----	----
thallium, TCLP	7440-28-0	E444	1.0	mg/L		<1.0	<1.0	----	----	----
uranium, TCLP	7440-61-1	E444	0.20	mg/L		<0.20	<0.20	----	----	----

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2212-A-11	BA2212-A-12	----	----	----
					Client sampling date / time	23-Mar-2022 09:00	23-Mar-2022 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA22A6415-011	VA22A6415-012	--------	--------	--------
						Result	Result	----	----	----
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L		<0.15	<0.15	----	----	----
zinc, TCLP	7440-66-6	E444	0.50	mg/L		27.0	49.0	----	----	----
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	: **VA22A6415**	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	: 29-Mar-2022 10:20
PO	: VANCO 0000051213	Issue Date	: 22-Apr-2022 10:25
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA22A6415-001	BA2212-A-1	antimony	7440-36-0	E440	37.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	cadmium	7440-43-9	E440	49.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	cobalt	7440-48-4	E440	123 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	copper	7440-50-8	E440	113 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	lithium	7439-93-2	E440	73.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	molybdenum	7439-98-7	E440	123 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	nickel	7440-02-0	E440	37.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	phosphorus	7723-14-0	E440	31.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	strontium	7440-24-6	E440	64.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	sulfur	7704-34-9	E440	38.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	tin	7440-31-5	E440	120 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	titanium	7440-32-6	E440	50.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA22A6415-001	BA2212-A-1	zinc	7440-66-6	E440	76.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-1	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-10	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-11	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-12	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-2	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-3	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-4	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 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 BA2212-A-5	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-6	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-7	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-8	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2212-A-9	E510	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	28 days	22 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-1	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-10	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-11	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-12	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 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 BA2212-A-2	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-3	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-4	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-5	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-6	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-7	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-8	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag BA2212-A-9	E440	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	180 days	23 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-1	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-10	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-11	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-12	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-2	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-3	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-4	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-5	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-6	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-7	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-8	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2212-A-9	E144	23-Mar-2022	----	----	----		12-Apr-2022	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-1	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-10	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-11	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-12	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-2	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-3	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-4	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 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 BA2212-A-5	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-6	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-7	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-8	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2212-A-9	E108	23-Mar-2022	13-Apr-2022	----	----		14-Apr-2022	30 days	22 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-1	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-10	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-11	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-12	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-2	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-3	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-4	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-5	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-6	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-7	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-8	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Mercury by CVAAS (TCLP)										
Glass vial - total (lab preserved) BA2212-A-9	E512	08-Apr-2022	----	----	----		13-Apr-2022	28 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-1	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times 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) BA2212-A-10	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-11	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-12	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-2	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-3	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-4	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-5	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-6	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-7	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times 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) BA2212-A-8	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2212-A-9	E444	08-Apr-2022	----	----	----		13-Apr-2022	180 days	21 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-1	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-10	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-11	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-12	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-2	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-3	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-4	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times 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: 28 day HT (e.g. Hg, CrVI) BA2212-A-5	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-6	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-7	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-8	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2212-A-9	EPP444	23-Mar-2022	08-Apr-2022	----	----		----	----	----	

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	456509	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	456510	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	456512	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	456511	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	456509	2	12	16.6	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	456510	2	12	16.6	10.0	✓
Moisture Content by Gravimetry	E144	456512	1	12	8.3	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	456511	1	12	8.3	5.0	✓
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	457432	1	12	8.3	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	456509	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	457433	1	12	8.3	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	456510	1	12	8.3	5.0	✓
Moisture Content by Gravimetry	E144	456512	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	457432	1	12	8.3	5.0	✓
Metals by CRC ICPMS (TCLP)	E444	457433	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. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with 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	: **VA22A6415**	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	: 29-Mar-2022 10:20
PO	: VANCO 0000051213	Date Analysis Commenced	: 08-Apr-2022
C-O-C number	: ----	Issue Date	: 22-Apr-2022 10:25
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.

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: 456511)											
VA22A6415-001	BA2212-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.4	1.1%	5%	----
Physical Tests (QC Lot: 456512)											
VA22A6415-001	BA2212-A-1	moisture	----	E144	0.25	%	23.7	23.7	0.238%	20%	----
Metals (QC Lot: 456509)											
VA22A6415-001	BA2212-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 456510)											
VA22A6415-001	BA2212-A-1	aluminum	7429-90-5	E440	50	mg/kg	33100	32200	3.00%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	92.1	134	37.4%	30%	DUP-H
		arsenic	7440-38-2	E440	0.10	mg/kg	16.1	20.1	22.0%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	529	407	26.1%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.38	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	14.8	11.5	25.2%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	230	206	10.8%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	7.05	11.7	49.7%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	117000	138000	16.4%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	152	151	0.740%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	39.9	168	123%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	1470	5270	113%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	50400	50300	0.183%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	461	455	1.28%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	17.5	37.9	73.8%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	10300	12900	22.0%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	643	723	11.7%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	126	530	123%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	93.9	137	37.6%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	7310	10000	31.4%	30%	DUP-H
		potassium	7440-09-7	E440	100	mg/kg	4680	5550	17.0%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.30	0.44	0.14	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	8.59	12.4	36.2%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	13300	16200	20.0%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	638	328	64.2%	40%	DUP-H

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: 456510) - continued											
VA22A6415-001	BA2212-A-1	sulfur	7704-34-9	E440	1000	mg/kg	10200	15000	38.2%	30%	DUP-H
		thallium	7440-28-0	E440	0.050	mg/kg	0.076	0.064	0.012	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	150	604	120%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	712	424	50.7%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	32.6	41.2	23.2%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	3.21	4.25	28.0%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	49.1	42.9	13.3%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	10300	4610	76.0%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.1	1.4	0.3	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: 456512)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 456509)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 456510)						
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: 456510) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
TCLP Metals (QCLot: 457432)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 457433)						
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: 456511)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 456512)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 456509)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	98.9	80.0	120	----
Metals (QCLot: 456510)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	92.6	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	92.9	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	89.9	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	90.0	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.0	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.9	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.2	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	94.4	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	94.1	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	91.0	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	91.6	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.8	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	88.2	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	98.1	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	92.4	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	92.4	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	100	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	90.7	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	96.2	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	92.7	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	93.8	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	90.2	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	102	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: 456510) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	96.2	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	87.9	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	108	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	93.2	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	92.6	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	93.3	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: 457432)										
VA22A6415-001	BA2212-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	98.4	50.0	140	----
TCLP Metals (QCLot: 457433)										
VA22A6415-001	BA2212-A-1	antimony, TCLP	7440-36-0	E444	5.0 mg/L	5 mg/L	99.0	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.4 mg/L	5 mg/L	88.5	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.9 mg/L	12.5 mg/L	103	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.193 mg/L	0.25 mg/L	77.3	50.0	140	----
		boron, TCLP	7440-42-8	E444	7.91 mg/L	10 mg/L	79.1	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.205 mg/L	0.25 mg/L	82.0	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	1.07 mg/L	1.25 mg/L	85.9	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.01 mg/L	2.5 mg/L	80.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	213 mg/L	250 mg/L	85.1	50.0	140	----
		lead, TCLP	7439-92-1	E444	8.88 mg/L	10 mg/L	88.8	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	228 mg/L	250 mg/L	91.3	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.03 mg/L	2.5 mg/L	81.2	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.35 mg/L	5 mg/L	87.0	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.097 mg/L	0.1 mg/L	96.9	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.3 mg/L	5 mg/L	86.8	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.63 mg/L	5 mg/L	92.6	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.63 mg/L	0.75 mg/L	83.8	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	8 mg/L	10 mg/L	75.4	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: 456509)									
QC-456509-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	99.8	70.0	130	----
Metals (QCLot: 456510)									
QC-456510-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	99.1	70.0	130	----
QC-456510-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	110	70.0	130	----
QC-456510-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	106	70.0	130	----
QC-456510-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	92.2	70.0	130	----
QC-456510-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	108	70.0	130	----
QC-456510-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	122	40.0	160	----
QC-456510-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	94.3	70.0	130	----
QC-456510-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	104	70.0	130	----
QC-456510-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	106	70.0	130	----
QC-456510-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	96.6	70.0	130	----
QC-456510-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.1	70.0	130	----
QC-456510-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	96.2	70.0	130	----
QC-456510-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	103	70.0	130	----
QC-456510-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	99.4	70.0	130	----
QC-456510-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	99.2	70.0	130	----
QC-456510-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
QC-456510-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	102	70.0	130	----
QC-456510-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	----
QC-456510-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	100	70.0	130	----
QC-456510-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	103	70.0	130	----
QC-456510-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	97.1	70.0	130	----
QC-456510-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----
QC-456510-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	105	40.0	160	----
QC-456510-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	98.4	70.0	130	----
QC-456510-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	110	70.0	130	----
QC-456510-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	109	70.0	130	----
QC-456510-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	101	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: 456510) - continued									
QC-456510-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	95.2	70.0	130	----
QC-456510-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	96.2	70.0	130	----

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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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)				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
	BA2212-A-1	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-2	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-3	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-4	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-5	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-6	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-7	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-8	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-9	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-10	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-11	23-Mar-22	9:00	Soil	X	X				X						1
	BA2212-A-12	23-Mar-22	9:00	Soil	X	X				X						1

Environmental Division
Vancouver
Work Order Reference
VA22A6415

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: 2022	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	29-Mar-22	0800	JC	29/Mar	10:20 am	21 °C				

GENF 20.00 Front