

Bottom Ash Data

2021 Week 2

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on January 20, 2021. The data represents bottom ash composite results for week 2 of 2021 (January 3, 2021 to January 9, 2021).

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



CERTIFICATE OF ANALYSIS

Work Order : **VA21A0508**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash-Suite
PO : VANCO 0000050390
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 12-Jan-2021 12:00
Date Analysis Commenced : 13-Jan-2021
Issue Date : 19-Jan-2021 11:28

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2102-A-1	BA2102-A-2	BA2102-A-3	BA2102-A-4	BA2102-A-5
(Matrix: Soil/Solid)					Client sampling date / time	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-001	VA21A0508-002	VA21A0508-003	VA21A0508-004	VA21A0508-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	26.0	23.9	24.4	23.6	26.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	10.9	11.3	10.9	11.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	36000	33700	40400	35600	40200	
antimony	7440-36-0	E440	0.10	mg/kg	126	131	103	150	117	
arsenic	7440-38-2	E440	0.10	mg/kg	16.6	17.2	12.9	14.6	20.4	
barium	7440-39-3	E440	0.50	mg/kg	654	539	735	650	663	
beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.40	0.40	0.36	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	6.31	14.6	4.45	7.50	37.7	
boron	7440-42-8	E440	5.0	mg/kg	218	182	141	178	267	
cadmium	7440-43-9	E440	0.020	mg/kg	12.0	283	9.42	11.0	10.2	
calcium	7440-70-2	E440	50	mg/kg	148000	150000	124000	140000	153000	
chromium	7440-47-3	E440	0.50	mg/kg	161	126	143	147	130	
cobalt	7440-48-4	E440	0.10	mg/kg	584	64.4	39.6	26.4	49.2	
copper	7440-50-8	E440	0.50	mg/kg	2650	1790	3070	5260	1520	
iron	7439-89-6	E440	50	mg/kg	61300	39700	39500	56700	65600	
lead	7439-92-1	E440	0.50	mg/kg	366	482	360	416	378	
lithium	7439-93-2	E440	2.0	mg/kg	32.3	24.3	16.7	19.6	22.7	
magnesium	7439-95-4	E440	20	mg/kg	12700	11200	11800	12700	11500	
manganese	7439-96-5	E440	1.0	mg/kg	888	666	986	724	5220	
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	18.1	15.2	17.8	16.3	15.4	
nickel	7440-02-0	E440	0.50	mg/kg	186	131	147	130	127	
phosphorus	7723-14-0	E440	50	mg/kg	11800	13800	10600	12000	15300	
potassium	7440-09-7	E440	100	mg/kg	4830	5110	4890	5070	5040	
selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.34	0.28	0.35	0.38	
silver	7440-22-4	E440	0.10	mg/kg	4.01	6.42	3.48	3.86	4.56	
sodium	7440-23-5	E440	50	mg/kg	14500	15100	14300	14900	14800	
strontium	7440-24-6	E440	0.50	mg/kg	638	320	351	299	316	
sulfur	7704-34-9	E440	1000	mg/kg	12300	15000	10200	12200	11300	



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2102-A-1	BA2102-A-2	BA2102-A-3	BA2102-A-4	BA2102-A-5
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-001	VA21A0508-002	VA21A0508-003	VA21A0508-004	VA21A0508-005
					Result	Result	Result	Result	Result
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	0.066	0.072	0.062	0.065	0.066
tin	7440-31-5	E440	2.0	mg/kg	123	301	88.8	152	199
titanium	7440-32-6	E440	1.0	mg/kg	380	210	411	322	391
tungsten	7440-33-7	E440	0.50	mg/kg	9.37	12.0	7.97	7.32	11.4
uranium	7440-61-1	E440	0.050	mg/kg	5.60	6.16	5.04	5.48	5.62
vanadium	7440-62-2	E440	0.20	mg/kg	51.4	48.8	48.0	48.2	47.9
zinc	7440-66-6	E440	2.0	mg/kg	3720	3710	3770	3420	4070
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	2.4	1.5	1.4	1.5
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.7	11.7	11.5	11.4
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.28	8.82	9.07	8.77	9.23
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444	0.010	pH units	6.28	6.09	6.01	5.92	6.25
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.90	1.59	1.74	2.25	1.74
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.384	0.131	0.151	0.169	0.142
calcium, TCLP	7440-70-2	E444	10	mg/L	2330	2040	2130	2350	2150
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	0.426	0.466	0.830	0.794	0.787
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.18	0.988	1.65	1.55	0.840
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	6.8	<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	135	123	124	141	128
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	0.47	0.73	0.47	0.48	0.48
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2102-A-1	BA2102-A-2	BA2102-A-3	BA2102-A-4	BA2102-A-5
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-001	VA21A0508-002	VA21A0508-003	VA21A0508-004	VA21A0508-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	37.1	40.3	45.2	44.4	62.0	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2102-A-6	BA2102-A-7	BA2102-A-8	BA2102-A-9	BA2102-A-10
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-006	VA21A0508-007	VA21A0508-008	VA21A0508-009	VA21A0508-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	25.2	25.2	24.4	26.2	25.7
pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	11.5	11.3	11.2	11.6
Metals									
aluminum	7429-90-5	E440	50	mg/kg	49900	42700	49300	44800	33800
antimony	7440-36-0	E440	0.10	mg/kg	112	113	135	110	122
arsenic	7440-38-2	E440	0.10	mg/kg	14.9	15.3	17.2	27.8	18.9
barium	7440-39-3	E440	0.50	mg/kg	681	660	572	596	566
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.40	0.42	0.39	0.38
bismuth	7440-69-9	E440	0.20	mg/kg	6.12	4.89	6.15	7.87	9.77
boron	7440-42-8	E440	5.0	mg/kg	177	156	176	150	171
cadmium	7440-43-9	E440	0.020	mg/kg	13.0	9.95	12.9	10.7	12.0
calcium	7440-70-2	E440	50	mg/kg	140000	143000	166000	133000	148000
chromium	7440-47-3	E440	0.50	mg/kg	309	141	206	180	146
cobalt	7440-48-4	E440	0.10	mg/kg	85.0	169	69.1	256	67.9
copper	7440-50-8	E440	0.50	mg/kg	3590	2550	1770	4950	3390
iron	7439-89-6	E440	50	mg/kg	59400	50600	47700	56900	56800
lead	7439-92-1	E440	0.50	mg/kg	286	312	456	602	788
lithium	7439-93-2	E440	2.0	mg/kg	46.8	26.6	25.4	34.6	21.6
magnesium	7439-95-4	E440	20	mg/kg	11100	11700	12700	11600	12200
manganese	7439-96-5	E440	1.0	mg/kg	1300	1480	1050	1030	981
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	17.0	16.6	18.6	19.3	19.5
nickel	7440-02-0	E440	0.50	mg/kg	262	130	167	294	135
phosphorus	7723-14-0	E440	50	mg/kg	12200	12000	13300	11200	12000
potassium	7440-09-7	E440	100	mg/kg	4870	5040	5340	5020	5050
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.32	0.34	0.34	0.42
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	5.04	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	4.94	----	5.54	3.64	4.30
sodium	7440-23-5	E440	50	mg/kg	14600	15100	16000	14600	14600
strontium	7440-24-6	E440	0.50	mg/kg	308	297	346	287	313
sulfur	7704-34-9	E440	1000	mg/kg	10800	10700	13400	11100	12800



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2102-A-6	BA2102-A-7	BA2102-A-8	BA2102-A-9	BA2102-A-10
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-006	VA21A0508-007	VA21A0508-008	VA21A0508-009	VA21A0508-010
					Result	Result	Result	Result	Result
Metals									
thallium	7440-28-0	E440	0.050	mg/kg	0.062	0.062	0.066	0.059	0.071
tin	7440-31-5	E440	2.0	mg/kg	106	236	119	112	188
titanium	7440-32-6	E440	1.0	mg/kg	652	932	412	396	306
tungsten	7440-33-7	E440	0.50	mg/kg	10.2	9.54	8.27	16.4	11.2
uranium	7440-61-1	E440	0.050	mg/kg	5.21	5.11	5.87	5.12	6.08
vanadium	7440-62-2	E440	0.20	mg/kg	53.1	48.4	56.6	49.3	55.5
zinc	7440-66-6	E440	2.0	mg/kg	4510	5460	3720	3500	4060
zirconium	7440-67-7	E440	1.0	mg/kg	2.4	2.4	3.9	2.8	2.3
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.6	11.8	11.7	11.9
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.26	8.53	8.70	8.73	8.96
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444	0.010	pH units	6.27	6.11	6.07	6.26	5.96
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.78	1.75	1.92	1.82	1.66
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.151	0.194	0.182	0.216	0.152
calcium, TCLP	7440-70-2	E444	10	mg/L	2090	2210	2500	2160	2060
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	1.25	1.18	0.888	0.809	1.07
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.11	2.31	1.13	1.03	1.19
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	0.66
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	128	138	157	133	129
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	0.40	0.38	0.49	0.49	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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2102-A-6	BA2102-A-7	BA2102-A-8	BA2102-A-9	BA2102-A-10
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00	06-Jan-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-006	VA21A0508-007	VA21A0508-008	VA21A0508-009	VA21A0508-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	39.7	67.1	58.2	39.0	37.4	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2102-A-11	BA2102-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-011	VA21A0508-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	24.5	25.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.1	11.2	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	33300	51400	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	139	119	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	15.0	14.8	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	672	793	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.42	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.25	10.2	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	162	297	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	12.4	11.8	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	142000	152000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	158	172	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	47.1	62.8	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2180	3700	----	----	----	
iron	7439-89-6	E440	50	mg/kg	66200	66300	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	701	362	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	20.9	23.4	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11600	11600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	742	946	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	15.4	29.1	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	136	187	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11500	12100	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4920	5070	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.30	0.37	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	9.42	9.93	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14000	15800	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	323	320	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12200	11600	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.066	0.061	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2102-A-11	BA2102-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-011	VA21A0508-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	175	172	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	365	743	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	22.9	10.0	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.60	5.56	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	49.3	50.6	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	3700	3500	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	2.0	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.7	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.52	8.59	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.27	6.23	----	----	----	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.82	1.74	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.192	0.137	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2050	2130	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.746	0.876	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.17	0.917	----	----	----	
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	124	128	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.40	0.45	----	----	----	
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	----	----	----	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2102-A-11	BA2102-A-12	----	----	----
Client sampling date / time					06-Jan-2021 09:00	06-Jan-2021 09:00	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA21A0508-011	VA21A0508-012	-----	-----	-----	
TCLP Metals					Result	Result	---	---	---	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	49.8	34.3	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21A0508	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	: +1 604 253 4188
Project	: Weekly Bottom Ash-Suite	Date Samples Received	: 12-Jan-2021 12:00
PO	: VANCO 0000050390	Issue Date	: 19-Jan-2021 11:28
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 Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

RIGHT SOLUTIONS | RIGHT PARTNER



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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2102-A-7	E440.Ag	06-Jan-2021	15-Jan-2021	180 days	9 days	✓	17-Jan-2021	170 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-1	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-10	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-11	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-12	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-2	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-3	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✓	14-Jan-2021	20 days	0 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-4	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-5	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-6	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-7	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-8	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2102-A-9	E510	06-Jan-2021	14-Jan-2021	28 days	7 days	✔	14-Jan-2021	20 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2102-A-1	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2102-A-10	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2102-A-11	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-12	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-2	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-3	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-4	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-5	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-6	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-7	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-8	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2102-A-9	E440	06-Jan-2021	14-Jan-2021	180 days	7 days	✔	14-Jan-2021	172 days	0 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-1	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-10	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-11	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-12	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-2	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-3	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-4	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-5	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2102-A-6	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2102-A-7	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2102-A-8	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2102-A-9	E144	06-Jan-2021	----	----	----		13-Jan-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-1	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-10	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-11	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-12	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-2	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-3	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-4	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-5	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-6	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-7	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-8	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2102-A-9	E108	06-Jan-2021	14-Jan-2021	30 days	7 days	✔	14-Jan-2021	22 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-1	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-10	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-11	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-12	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-2	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-3	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-4	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-5	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-6	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-7	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-8	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2102-A-9	E512	15-Jan-2021	----	----	----		16-Jan-2021	37 days	10 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-1	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-10	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-11	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-12	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-2	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-3	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-4	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-5	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2102-A-6	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2102-A-7	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2102-A-8	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2102-A-9	E444	15-Jan-2021	----	----	----		17-Jan-2021	189 days	11 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-1	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-10	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-11	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-12	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-2	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-3	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-4	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-5	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-6	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-7	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-8	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2102-A-9	EPP444	06-Jan-2021	15-Jan-2021	----	----		----	----	----	

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	140358	1	16	6.2	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	140359	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	140361	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	140360	1	16	6.2	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	141419	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	140358	2	16	12.5	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	140359	2	16	12.5	10.0	✔
Moisture Content by Gravimetry	E144	140361	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	140360	1	16	6.2	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	141419	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	141772	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	140358	1	16	6.2	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	141773	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	140359	1	16	6.2	5.0	✔
Moisture Content by Gravimetry	E144	140361	1	16	6.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	141772	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	141773	1	12	8.3	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : **VA21A0508**

Page : 1 of 11

Client : Covanta Burnaby Renewable Energy, ULC
 Contact : Steve McKinney
 Address : 5150 Riverbend Drive
 Burnaby BC Canada V3N 4V3
 Telephone : 604 521 1025
 Project : Weekly Bottom Ash-Suite
 PO : VANCO 0000050390
 C-O-C number : ----
 Sampler : ----
 Site : ----
 Quote number : Standing Offer (BC work)
 No. of samples received : 12
 No. of samples analysed : 12

Laboratory : Vancouver - Environmental
 Account Manager : Brent Mack
 Address : 8081 Lougheed Highway
 Burnaby, British Columbia Canada V5A 1W9
 Telephone : +1 604 253 4188
 Date Samples Received : 12-Jan-2021 12:00
 Date Analysis Commenced : 13-Jan-2021
 Issue Date : 19-Jan-2021 11:28

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
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia

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Work Order : VA21A0508
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash-Suite



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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



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: 140360)											
KS2100084-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.12	8.15	0.369%	5%	----
Physical Tests (QC Lot: 140361)											
KS2100084-001	Anonymous	moisture	----	E144	0.25	%	18.9	18.6	1.96%	20%	----
Metals (QC Lot: 140358)											
KS2100084-001	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0760	0.0260	Diff <2x LOR	----
Metals (QC Lot: 140359)											
KS2100084-001	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	15400	15400	0.316%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.36	0.38	0.03	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	6.31	6.21	1.63%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	145	150	2.89%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.39	0.004	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.266	0.236	11.9%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	21200	21500	1.45%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	62.9	60.3	4.21%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	17.9	17.6	1.88%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	42.6	43.2	1.38%	30%	----
		iron	7439-89-6	E440	50	mg/kg	34900	33600	3.84%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	6.48	6.61	1.92%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	10.5	10.4	0.05	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	13400	13000	3.13%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	633	604	4.76%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	1.90	1.91	0.502%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	65.0	63.6	2.28%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	1050	990	6.09%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	1620	1590	2.30%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.12	0.12	0.005	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	704	662	6.25%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	106	106	0.610%	40%	----

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 Work Order : VA21A0508
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash-Suite



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Metals (QC Lot: 140359) - continued											
KS2100084-001	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.116	0.121	0.006	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1800	1720	4.74%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	1.15	1.11	3.08%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	74.4	71.3	4.24%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	67.8	67.0	1.31%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	11.3	12.9	13.3%	30%	----



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: 140361)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 140358)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 140359)						
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: 140359) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 141419)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 141772)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 141773)						
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	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 140360)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 140361)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 140358)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	100	80.0	120	----
Metals (QCLot: 140359)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	97.7	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	98.8	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	98.4	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	95.1	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.1	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	92.9	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.6	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.7	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	99.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.9	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	99.7	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	97.2	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	94.2	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	99.1	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.2	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.6	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.5	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	94.4	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	98.7	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	93.6	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	99.8	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	97.4	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
Metals (QCLot: 140359) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	95.6	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	97.4	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	95.6	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.5	80.0	120	----
Metals (QCLot: 141419)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	105	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: 141772)										
VA21A0508-001	BA2102-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	94.1	50.0	140	----
TCLP Metals (QCLot: 141773)										
VA21A0508-001	BA2102-A-1	antimony, TCLP	7440-36-0	E444	6.2 mg/L	5 mg/L	123	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	99.2	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.3 mg/L	12.5 mg/L	107	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.246 mg/L	0.25 mg/L	98.3	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.11 mg/L	10 mg/L	91.1	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.22 mg/L	1.25 mg/L	98.0	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.38 mg/L	2.5 mg/L	95.2	50.0	140	----
		iron, TCLP	7439-89-6	E444	244 mg/L	250 mg/L	97.4	50.0	140	----
		lead, TCLP	7439-92-1	E444	11.2 mg/L	10 mg/L	112	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	275 mg/L	250 mg/L	110	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.46 mg/L	2.5 mg/L	98.5	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.92 mg/L	5 mg/L	98.5	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.123 mg/L	0.1 mg/L	123	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.4 mg/L	5 mg/L	107	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	102	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 140358)									
QC-140358-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	97.3	70.0	130	----
Metals (QCLot: 140359)									
QC-140359-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
QC-140359-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	99.6	70.0	130	----
QC-140359-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	108	70.0	130	----
QC-140359-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-140359-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	103	70.0	130	----
QC-140359-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	122	40.0	160	----
QC-140359-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	102	70.0	130	----
QC-140359-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	105	70.0	130	----
QC-140359-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	116	70.0	130	----
QC-140359-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	102	70.0	130	----
QC-140359-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	99.3	70.0	130	----
QC-140359-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-140359-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.6	70.0	130	----
QC-140359-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	101	70.0	130	----
QC-140359-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
QC-140359-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	107	70.0	130	----
QC-140359-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	106	70.0	130	----
QC-140359-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
QC-140359-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	90.6	70.0	130	----
QC-140359-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	118	70.0	130	----
QC-140359-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	99.7	70.0	130	----
QC-140359-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	107	70.0	130	----
QC-140359-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	103	40.0	160	----
QC-140359-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	100	70.0	130	----
QC-140359-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
QC-140359-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	112	70.0	130	----
QC-140359-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	109	70.0	130	----

Page : 11 of 11
 Work Order : VA21A0508
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash-Suite




Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 140359) - continued									
QC-140359-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	95.6	70.0	130	----
QC-140359-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	109	70.0	130	----



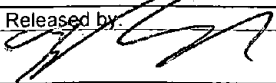
Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard <input type="checkbox"/> Other <input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
Contact:	Steve Mckinney / Dan Skrypnik	Email 1:	smckinney@covanta.com		
Address:	5150 Riverbend Drive Burnaby BC	Email 2:	riohanson4@covanta.com		
Phone:	604-521-1025	Fax:			
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dkrypnik@covanta.com		
			brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

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

Lab Work Order # (lab use only)		ALS Contact:	Sampler:	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
Sample #	Sample Identification (This d...)										
	Environmental Division Vancouver Work Order Reference VA21A0508										
											
	Telephone : +1 604 263 4188										
BA2102-A-1				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-2				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-3				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-4				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-5				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-6				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-7				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-8				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-9				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-10				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-11				06-Jan-21	9:00	Soil	X	X		X	1
BA2102-A-12				06-Jan-21	9:00	Soil	X	X		X	1

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

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
 By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.
 Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy):	Time (hh-mm):	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
	12-Jan-21	0800	(A1) JC	JAN 12 2021	12pm	18 °C				Yes / No ? If Yes add SIF