

Bottom Ash Data

2021 Week 32

The following analytical report represents bottom ash composite results for week 32 of 2021 (August 1, 2021 to August 7, 2021).

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



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **VA21B6604**
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 : 778-370-3279
Date Samples Received : 10-Aug-2021 11:45
Date Analysis Commenced : 13-Aug-2021
Issue Date : 18-Aug-2021 14:09

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>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kelly Fischer	Team Leader - Inorganics	Inorganics, Waterloo, Ontario
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2132-A-1	BA2132-A-2	BA2132-A-3	BA2132-A-4	BA2132-A-5
(Matrix: Soil/Solid)					Client sampling date / time	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-001	VA21B6604-002	VA21B6604-003	VA21B6604-004	VA21B6604-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	17.6	17.1	17.3	17.2	17.1	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.3	11.5	11.2	11.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	29200	34300	32800	28600	30300	
antimony	7440-36-0	E440	0.10	mg/kg	79.6	101	101	91.2	103	
arsenic	7440-38-2	E440	0.10	mg/kg	25.5	27.5	26.9	43.8	24.6	
barium	7440-39-3	E440	0.50	mg/kg	721	753	559	484	709	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.48	0.38	0.40	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	5.96	8.33	9.96	14.1	249	
boron	7440-42-8	E440	5.0	mg/kg	175	185	221	229	157	
cadmium	7440-43-9	E440	0.020	mg/kg	17.3	7.80	7.83	7.59	9.42	
calcium	7440-70-2	E440	50	mg/kg	129000	129000	135000	118000	126000	
chromium	7440-47-3	E440	0.50	mg/kg	149	171	160	134	169	
cobalt	7440-48-4	E440	0.10	mg/kg	167	198	49.4	79.8	67.9	
copper	7440-50-8	E440	0.50	mg/kg	26600	2940	2320	9850	5510	
iron	7439-89-6	E440	50	mg/kg	62200	61200	54700	62900	80900	
lead	7439-92-1	E440	0.50	mg/kg	389	512	542	1380	5790	
lithium	7439-93-2	E440	2.0	mg/kg	25.8	34.4	24.9	23.5	23.9	
magnesium	7439-95-4	E440	20	mg/kg	11700	12000	12000	9300	11700	
manganese	7439-96-5	E440	1.0	mg/kg	894	795	771	728	1120	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0548	0.0641	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	13.5	16.1	18.4	14.7	17.2	
nickel	7440-02-0	E440	0.50	mg/kg	128	250	192	152	830	
phosphorus	7723-14-0	E440	50	mg/kg	11400	11900	12100	9470	10300	
potassium	7440-09-7	E440	100	mg/kg	4600	4880	5000	4340	4490	
selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.32	0.34	0.31	0.44	
silver	7440-22-4	E440	0.10	mg/kg	3.73	4.47	4.20	5.76	19.6	
sodium	7440-23-5	E440	50	mg/kg	14200	14800	14100	12100	13600	
strontium	7440-24-6	E440	0.50	mg/kg	286	300	298	263	296	
sulfur	7704-34-9	E440	1000	mg/kg	9600	10900	10800	10000	9600	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2132-A-1	BA2132-A-2	BA2132-A-3	BA2132-A-4	BA2132-A-5
Client sampling date / time					04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-001	VA21B6604-002	VA21B6604-003	VA21B6604-004	VA21B6604-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
tin	7440-31-5	E440	2.0	mg/kg	91.2	136	101	238	3860	
titanium	7440-32-6	E440	1.0	mg/kg	433	435	311	173	555	
tungsten	7440-33-7	E440	0.50	mg/kg	5.51	5.21	7.39	7.52	6.06	
uranium	7440-61-1	E440	0.050	mg/kg	2.25	2.32	2.56	2.10	2.26	
vanadium	7440-62-2	E440	0.20	mg/kg	32.5	34.6	31.8	26.8	32.9	
zinc	7440-66-6	E440	2.0	mg/kg	6920	3720	4360	4550	4470	
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.4	2.0	3.1	1.4	
Speciated Metals										
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.10	mg/kg	0.44	----	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.8	11.7	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.66	9.01	9.11	8.77	9.46	
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	6.29	6.33	6.28	6.07	6.14	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.93	1.98	2.00	2.12	2.14	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.159	0.088	0.096	0.129	0.129	
calcium, TCLP	7440-70-2	E444	10	mg/L	1980	2070	2050	2060	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	2.24	0.897	0.990	0.717	0.865	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.932	0.679	1.02	1.16	0.970	
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	0.29	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	136	140	145	140	162	
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	0.58	0.60	0.56	0.69	1.29	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2132-A-1	BA2132-A-2	BA2132-A-3	BA2132-A-4	BA2132-A-5
Client sampling date / time					04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-001	VA21B6604-002	VA21B6604-003	VA21B6604-004	VA21B6604-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<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	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	47.5	35.8	34.8	49.7	42.3	42.3
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2132-A-6	BA2132-A-7	BA2132-A-8	BA2132-A-9	BA2132-A-10
(Matrix: Soil/Solid)					Client sampling date / time	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-006	VA21B6604-007	VA21B6604-008	VA21B6604-009	VA21B6604-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.4	15.8	15.2	18.7	16.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.6	11.4	11.4	11.4	11.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	30400	31600	30100	40800	34100	
antimony	7440-36-0	E440	0.10	mg/kg	112	103	96.4	536	97.5	
arsenic	7440-38-2	E440	0.10	mg/kg	29.6	28.9	30.3	31.3	34.3	
barium	7440-39-3	E440	0.50	mg/kg	621	614	585	706	605	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.36	0.36	0.39	0.41	
bismuth	7440-69-9	E440	0.20	mg/kg	8.88	22.9	8.58	7.25	6.74	
boron	7440-42-8	E440	5.0	mg/kg	204	184	185	173	186	
cadmium	7440-43-9	E440	0.020	mg/kg	19.2	12.3	47.1	8.75	9.48	
calcium	7440-70-2	E440	50	mg/kg	144000	137000	138000	122000	144000	
chromium	7440-47-3	E440	0.50	mg/kg	174	177	194	188	189	
cobalt	7440-48-4	E440	0.10	mg/kg	416	97.7	120	37.5	84.7	
copper	7440-50-8	E440	0.50	mg/kg	3320	3430	2890	11200	1810	
iron	7439-89-6	E440	50	mg/kg	65000	70000	62700	71800	51500	
lead	7439-92-1	E440	0.50	mg/kg	1180	535	1500	2880	1920	
lithium	7439-93-2	E440	2.0	mg/kg	57.2	23.5	35.2	22.6	25.4	
magnesium	7439-95-4	E440	20	mg/kg	11900	12200	12000	10100	12600	
manganese	7439-96-5	E440	1.0	mg/kg	881	808	870	994	923	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0508	0.213	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	20.6	22.1	20.0	20.9	16.3	
nickel	7440-02-0	E440	0.50	mg/kg	321	157	185	420	166	
phosphorus	7723-14-0	E440	50	mg/kg	12900	11600	11900	11400	14000	
potassium	7440-09-7	E440	100	mg/kg	5180	5170	5160	4830	5420	
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.49	0.30	0.26	0.36	
silver	7440-22-4	E440	0.10	mg/kg	6.08	4.88	4.84	8.27	7.20	
sodium	7440-23-5	E440	50	mg/kg	14400	15000	14600	13400	15400	
strontium	7440-24-6	E440	0.50	mg/kg	323	340	300	292	328	
sulfur	7704-34-9	E440	1000	mg/kg	11800	11800	11800	10500	12100	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2132-A-6	BA2132-A-7	BA2132-A-8	BA2132-A-9	BA2132-A-10
Client sampling date / time					04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-006	VA21B6604-007	VA21B6604-008	VA21B6604-009	VA21B6604-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	325	128	89.1	446	116	
titanium	7440-32-6	E440	1.0	mg/kg	307	310	224	499	325	
tungsten	7440-33-7	E440	0.50	mg/kg	10.5	19.4	6.13	5.87	6.40	
uranium	7440-61-1	E440	0.050	mg/kg	2.74	2.57	2.52	2.28	2.86	
vanadium	7440-62-2	E440	0.20	mg/kg	33.6	33.0	37.4	35.0	36.3	
zinc	7440-66-6	E440	2.0	mg/kg	5350	4360	4600	9060	4100	
zirconium	7440-67-7	E440	1.0	mg/kg	2.0	1.8	1.5	1.6	1.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.8	11.7	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.64	9.10	8.20	8.81	8.97	
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	6.37	6.09	5.80	6.39	6.43	
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	1.97	1.78	1.82	2.18	1.82	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.181	0.100	0.148	0.148	0.115	
calcium, TCLP	7440-70-2	E444	10	mg/L	2030	1880	1970	2070	1900	
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	1.36	0.815	0.569	0.874	1.26	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.750	1.37	0.988	0.663	1.25	
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	0.81	<0.25	<0.25	0.43	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	149	135	138	141	132	
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	0.56	0.62	0.65	0.47	1.07	
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)					Client sample ID	BA2132-A-6	BA2132-A-7	BA2132-A-8	BA2132-A-9	BA2132-A-10
Client sampling date / time					04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00	04-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-006	VA21B6604-007	VA21B6604-008	VA21B6604-009	VA21B6604-010	
					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	39.5	55.5	39.2	27.0	58.4	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2132-A-11	BA2132-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	04-Aug-2021 09:00	04-Aug-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-011	VA21B6604-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	18.6	16.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.5	11.5	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39500	40900	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	90.5	91.2	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	29.4	27.9	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	674	572	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.39	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	7.01	7.02	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	255	202	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.2	7.67	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	138000	143000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	154	152	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	40.8	51.8	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2760	2260	----	----	----	
iron	7439-89-6	E440	50	mg/kg	62200	63100	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	541	490	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	27.2	31.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12000	11600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	850	816	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0590	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	19.1	20.0	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	157	139	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	12700	12800	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5080	5140	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.31	0.31	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	9.99	6.77	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14700	14800	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	320	306	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	11300	11600	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2132-A-11	BA2132-A-12	----	----	----
Client sampling date / time					04-Aug-2021 09:00	04-Aug-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-011	VA21B6604-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	228	125	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	375	257	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	6.50	4.97	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	2.44	2.46	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	33.7	31.8	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	5340	4700	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.8	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.7	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.84	8.51	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.35	5.93	---	---	---	
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	2.07	1.96	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.126	0.119	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2070	2040	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.47	0.887	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.976	0.960	---	---	---	
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	132	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.74	1.84	---	---	---	
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	BA2132-A-11	BA2132-A-12	----	----	----
					Client sampling date / time	04-Aug-2021 09:00	04-Aug-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B6604-011	VA21B6604-012	-----	-----	-----	
					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	28.7	39.6	----	----	----	
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	: VA21B6604	Page	: 1 of 15
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 10-Aug-2021 11:45
PO	: VANCO 0000050390	Issue Date	: 18-Aug-2021 14:09
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA21B6604-001	BA2132-A-1	cadmium	7440-43-9	E440	73.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B6604-001	BA2132-A-1	cobalt	7440-48-4	E440	31.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B6604-001	BA2132-A-1	titanium	7440-32-6	E440	40.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B6604-001	BA2132-A-1	zinc	7440-66-6	E440	46.9 % 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		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-1	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-10	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-11	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-12	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-2	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-3	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2132-A-4	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✓



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2132-A-5	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2132-A-6	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2132-A-7	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2132-A-8	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2132-A-9	E510	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	28 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2132-A-1	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2132-A-10	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2132-A-11	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2132-A-12	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-2	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-3	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-4	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-5	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-6	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-7	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-8	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2132-A-9	E440	04-Aug-2021	13-Aug-2021	----	----		16-Aug-2021	180 days	12 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2132-A-1	E144	04-Aug-2021	----	----	----		13-Aug-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 BA2132-A-10	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-11	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-12	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-2	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-3	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-4	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-5	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-6	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2132-A-7	E144	04-Aug-2021	----	----	----		13-Aug-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 BA2132-A-8	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2132-A-9	E144	04-Aug-2021	----	----	----		13-Aug-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-1	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-10	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-11	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-12	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-2	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-3	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-4	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-5	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-6	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-7	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-8	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2132-A-9	E108	04-Aug-2021	13-Aug-2021	----	----		13-Aug-2021	30 days	9 days	✔	
Speciated Metals : Hexavalent Chromium (Cr VI) by IC											
Glass soil jar/Teflon lined cap BA2132-A-1	E532	04-Aug-2021	18-Aug-2021	30 days	14 days	✔	18-Aug-2021	7 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2132-A-1	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2132-A-10	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2132-A-11	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	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 : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-12	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-2	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-3	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-4	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-5	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-6	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-7	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-8	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2132-A-9	E512	13-Aug-2021	----	----	----		15-Aug-2021	----	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) BA2132-A-1	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-10	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-11	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-12	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-2	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-3	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-4	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-5	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-6	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 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) BA2132-A-7	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-8	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2132-A-9	E444	13-Aug-2021	----	----	----		15-Aug-2021	180 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) BA2132-A-1	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-10	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-11	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-12	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-2	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-3	EPP444	04-Aug-2021	13-Aug-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) BA2132-A-4	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-5	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-6	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-7	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-8	EPP444	04-Aug-2021	13-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2132-A-9	EPP444	04-Aug-2021	13-Aug-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)							
Hexavalent Chromium (Cr VI) by IC	E532	269548	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	265922	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	265923	1	13	7.6	5.0	✔
Moisture Content by Gravimetry	E144	265925	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	265924	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
Hexavalent Chromium (Cr VI) by IC	E532	269548	2	1	200.0	10.0	✔
Mercury in Soil/Solid by CVAAS	E510	265922	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	265923	2	13	15.3	10.0	✔
Moisture Content by Gravimetry	E144	265925	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	265924	1	13	7.6	5.0	✔
Method Blanks (MB)							
Hexavalent Chromium (Cr VI) by IC	E532	269548	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	267186	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	265922	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	267187	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	265923	1	13	7.6	5.0	✔
Moisture Content by Gravimetry	E144	265925	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	267186	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	267187	1	12	8.3	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
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 CVAAS ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Hexavalent Chromium (Cr VI) by IC	E532 Waterloo - Environmental	Soil/Solid	APHA 3500-CR C	Instrumental analysis is performed by ion chromatography with UV detection.
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.
Preparation of Hexavalent Chromium (Cr VI) for IC	EP532 Waterloo - Environmental	Soil/Solid	EPA 3060A	Field moist samples are digested with a sodium hydroxide/sodium carbonate solution as described in EPA 3060A.
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 : VA21B6604

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 : 778-370-3279
Date Samples Received : 10-Aug-2021 11:45
Date Analysis Commenced : 13-Aug-2021
Issue Date : 18-Aug-2021 14:09

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Angela Ren (Team Leader - Metals), Janice Leung (Supervisor - Organics Instrumentation), Kelly Fischer (Team Leader - Inorganics), Robin Weeks (Team Leader - Metals), and Shaneel Dayal (Analyst).

Page : 2 of 11
Work Order : VA21B6604
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: 265924)											
VA21B6604-001	BA2132-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.5	0.7%	5%	----
Physical Tests (QC Lot: 265925)											
VA21B6604-001	BA2132-A-1	moisture	----	E144	0.25	%	17.6	18.2	3.23%	20%	----
Metals (QC Lot: 265922)											
VA21B6604-001	BA2132-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 265923)											
VA21B6604-001	BA2132-A-1	aluminum	7429-90-5	E440	50	mg/kg	29200	31600	7.76%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	79.6	92.7	15.2%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	25.5	27.1	6.20%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	721	569	23.6%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.36	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	5.96	7.15	18.2%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	175	199	12.8%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	17.3	8.04	73.0%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	129000	128000	0.499%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	149	146	2.22%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	167	121	31.9%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	26600	19700	29.9%	30%	----
		iron	7439-89-6	E440	50	mg/kg	62200	59100	5.04%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	389	524	29.7%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	25.8	30.4	16.4%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11700	11600	0.644%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	894	742	18.7%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	13.5	17.1	23.5%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	128	136	5.60%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11400	11500	1.46%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4600	4670	1.45%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.36	0.04	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	3.73	4.52	19.1%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	14200	13200	7.80%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	286	295	3.05%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 265923) - continued											
VA21B6604-001	BA2132-A-1	sulfur	7704-34-9	E440	1000	mg/kg	9600	10800	12.4%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	91.2	111	19.5%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	433	287	40.4%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	5.51	6.01	8.67%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	2.25	2.34	4.24%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	32.5	32.6	0.311%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	6920	4290	46.9%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.7	0.04	Diff <2x LOR	----
Speciated Metals (QC Lot: 269548)											
VA21B6604-001	BA2132-A-1	chromium, hexavalent [Cr VI]	18540-29-9	E532	0.10	mg/kg	0.44	0.49	0.05	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: 265925)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 265922)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 265923)						
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: 265923) - 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	---
Speciated Metals (QCLot: 269548)						
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.1	mg/kg	<0.10	---
TCLP Metals (QCLot: 267186)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	---
TCLP Metals (QCLot: 267187)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	---
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	---
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	---
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	---
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	---
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	---
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	---
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	---
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	---
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	---
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	---
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	---
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	---
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	---
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	---
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	---
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	---
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	---
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	---
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	---
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	---



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 265924)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.3	95.0	105	----
Physical Tests (QCLot: 265925)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 265922)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	94.4	80.0	120	----
Metals (QCLot: 265923)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	98.6	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	96.6	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	100	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	99.6	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	100	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	98.8	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.9	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.5	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	99.0	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.2	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.7	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.3	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.5	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.7	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.9	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	97.5	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	99.5	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	98.2	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	94.8	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	100	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: 265923) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	94.6	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	89.3	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	103	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	109	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	95.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.3	80.0	120	----
Speciated Metals (QCLot: 269548)									
chromium, hexavalent [Cr VI]	18540-29-9	E532	0.1	mg/kg	0.8 mg/kg	88.5	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: 267186)										
VA21B6604-001	BA2132-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	100.0	50.0	140	----
TCLP Metals (QCLot: 267187)										
VA21B6604-001	BA2132-A-1	antimony, TCLP	7440-36-0	E444	5.4 mg/L	5 mg/L	109	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		barium, TCLP	7440-39-3	E444	14.7 mg/L	12.5 mg/L	117	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.264 mg/L	0.25 mg/L	106	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.5 mg/L	10 mg/L	105	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.261 mg/L	0.25 mg/L	104	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	1.24 mg/L	1.25 mg/L	99.2	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	2.46 mg/L	2.5 mg/L	98.4	50.0	140	----
		iron, TCLP	7439-89-6	E444	257 mg/L	250 mg/L	103	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.96 mg/L	10 mg/L	99.6	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	268 mg/L	250 mg/L	107	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.50 mg/L	2.5 mg/L	100	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.62 mg/L	5 mg/L	112	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.114 mg/L	0.1 mg/L	114	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	98.2	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.91 mg/L	5 mg/L	98.2	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.76 mg/L	0.75 mg/L	101	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	10 mg/L	10 mg/L	98.2	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 265922)									
QC-265922-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	92.5	70.0	130	----
Metals (QCLot: 265923)									
QC-265923-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	101	70.0	130	----
QC-265923-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	92.0	70.0	130	----
QC-265923-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-265923-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	98.5	70.0	130	----
QC-265923-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-265923-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	115	40.0	160	----
QC-265923-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	100	70.0	130	----
QC-265923-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	100	70.0	130	----
QC-265923-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	105	70.0	130	----
QC-265923-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	99.4	70.0	130	----
QC-265923-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.3	70.0	130	----
QC-265923-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-265923-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.9	70.0	130	----
QC-265923-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	97.5	70.0	130	----
QC-265923-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	98.4	70.0	130	----
QC-265923-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
QC-265923-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	97.1	70.0	130	----
QC-265923-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	100	70.0	130	----
QC-265923-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	95.0	70.0	130	----
QC-265923-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
QC-265923-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	98.7	70.0	130	----
QC-265923-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	98.4	70.0	130	----
QC-265923-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	97.8	40.0	160	----
QC-265923-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	106	70.0	130	----
QC-265923-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	104	70.0	130	----
QC-265923-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	110	70.0	130	----
QC-265923-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	104	70.0	130	----

Page : 11 of 11
 Work Order : VA21B6604
 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: 265923) - continued									
QC-265923-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	95.2	70.0	130	----
QC-265923-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	102	70.0	130	----
Speciated Metals (QCLot: 269548)									
QC-269548-003	RM	chromium, hexavalent [Cr VI]	18540-29-9	E532	234.4 mg/kg	87.7	70.0	130	----



Chain of Custody / Analytical Request Form

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COC # _____

Page ____ of ____

Report To		Report-Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact:	Steve Mckinney / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive	Email 1:	smckinney@covanta.com		
	Burnaby BC	Email 2:	rjohnson4@covanta.com		
Phone:	604-521-1025	Fax:	Email 3: dskrypnik@covanta.com		
	<input type="checkbox"/> Yes <input type="checkbox"/> No		brent.kirkpatrick@metrovancover.org		
			Sarah.Wellman@metrovancover.org		

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

Lab Work Order # (lab use only)		ALS Contact:	Sampler:									Number of Containers
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)				

6609

Environmental Division
Vancouver
Work Order Reference
VA21B6604

Telephone : +1 604 253 4188

BA2132-A-1	04-Aug-21	9:00	Soil	X	X	X	X												1
BA2132-A-2	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-3	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-4	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-5	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-6	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-7	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-8	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-9	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-10	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-11	04-Aug-21	9:00	Soil	X	X		X												1
BA2132-A-12	04-Aug-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)			Observations:	
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Yes / No ? If Yes add SIF
<i>[Signature]</i>	10-Aug-21	0800				24°C	<i>[Signature]</i>	10-Aug-21	1145	