

Bottom Ash Data

2021 Week 27

The following analytical report represents bottom ash composite results for week 27 of 2021 (June 27, 2021 to July 3, 2021).

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



CERTIFICATE OF ANALYSIS

Work Order : **VA21B3610**
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 : 06-Jul-2021 11:45
Date Analysis Commenced : 07-Jul-2021
Issue Date : 13-Jul-2021 12:45

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
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - 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

Sub-Matrix: Soil					Client sample ID	BA2127-A-1	BA2127-A-2	BA2127-A-3	BA2127-A-4	BA2127-A-5
(Matrix: Soil/Solid)					Client sampling date / time	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-001	VA21B3610-002	VA21B3610-003	VA21B3610-004	VA21B3610-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	20.5	21.1	21.5	21.3	21.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.5	10.5	10.5	10.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	34600	30000	37700	38400	32700	
antimony	7440-36-0	E440	0.10	mg/kg	116	136	132	99.1	108	
arsenic	7440-38-2	E440	0.10	mg/kg	32.2	46.9	37.3	32.4	40.5	
barium	7440-39-3	E440	0.50	mg/kg	601	557	667	587	531	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.38	0.42	0.39	0.33	
bismuth	7440-69-9	E440	0.20	mg/kg	7.91	8.82	9.98	7.52	13.5	
boron	7440-42-8	E440	5.0	mg/kg	208	232	245	219	157	
cadmium	7440-43-9	E440	0.020	mg/kg	13.0	11.2	12.1	9.24	10.6	
calcium	7440-70-2	E440	50	mg/kg	122000	115000	122000	129000	110000	
chromium	7440-47-3	E440	0.50	mg/kg	175	178	268	252	152	
cobalt	7440-48-4	E440	0.10	mg/kg	68.4	35.0	102	47.2	210	
copper	7440-50-8	E440	0.50	mg/kg	5330	22500	21700	3220	2640	
iron	7439-89-6	E440	50	mg/kg	61500	72700	101000	72400	78300	
lead	7439-92-1	E440	0.50	mg/kg	650	2070	1840	353	1390	
lithium	7439-93-2	E440	2.0	mg/kg	27.8	23.9	31.2	23.8	32.2	
magnesium	7439-95-4	E440	20	mg/kg	11400	10900	11800	11200	10700	
manganese	7439-96-5	E440	1.0	mg/kg	747	995	1320	796	873	
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	40.4	40.2	58.3	45.1	35.7	
nickel	7440-02-0	E440	0.50	mg/kg	680	168	2240	120	159	
phosphorus	7723-14-0	E440	50	mg/kg	11400	10900	11700	14000	9980	
potassium	7440-09-7	E440	100	mg/kg	6080	5970	6280	5580	5500	
selenium	7782-49-2	E440	0.20	mg/kg	0.53	0.44	0.54	0.49	0.37	
silver	7440-22-4	E440	0.10	mg/kg	11.2	6.78	6.14	5.10	5.36	
sodium	7440-23-5	E440	50	mg/kg	15600	15200	14800	15600	14600	
strontium	7440-24-6	E440	0.50	mg/kg	308	277	304	290	267	
sulfur	7704-34-9	E440	1000	mg/kg	14000	15300	14600	12700	12300	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2127-A-1	BA2127-A-2	BA2127-A-3	BA2127-A-4	BA2127-A-5
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-001	VA21B3610-002	VA21B3610-003	VA21B3610-004	VA21B3610-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.059	0.059	0.068	<0.050	0.067	
tin	7440-31-5	E440	2.0	mg/kg	114	195	368	121	178	
titanium	7440-32-6	E440	1.0	mg/kg	507	615	959	352	762	
tungsten	7440-33-7	E440	0.50	mg/kg	8.43	11.5	11.9	8.65	8.72	
uranium	7440-61-1	E440	0.050	mg/kg	5.08	4.80	5.11	4.30	4.74	
vanadium	7440-62-2	E440	0.20	mg/kg	49.0	53.6	64.6	49.9	46.7	
zinc	7440-66-6	E440	2.0	mg/kg	4320	7130	9000	5000	3920	
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.1	1.4	2.4	<1.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.3	11.3	11.3	11.3	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.69	8.55	8.23	8.33	8.41	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	6.35	6.18	6.04	6.25	6.32	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.06	2.10	2.08	2.09	2.49	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.165	0.254	0.265	0.156	0.175	
calcium, TCLP	7440-70-2	E444	10	mg/L	1850	1930	1970	1890	2200	
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	1.20	0.964	1.26	1.06	1.00	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.599	0.898	0.942	0.462	0.589	
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	0.30	<0.25	<0.25	0.27	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	146	139	143	140	159	
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	0.55	0.71	0.73	0.63	
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	BA2127-A-1	BA2127-A-2	BA2127-A-3	BA2127-A-4	BA2127-A-5
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-001	VA21B3610-002	VA21B3610-003	VA21B3610-004	VA21B3610-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	30.5	40.4	51.7	46.3	45.2	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2127-A-6	BA2127-A-7	BA2127-A-8	BA2127-A-9	BA2127-A-10
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-006	VA21B3610-007	VA21B3610-008	VA21B3610-009	VA21B3610-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	21.0	19.7	21.4	20.2	20.8	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.6	10.7	10.6	10.8	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	30700	28500	30000	35400	31200	
antimony	7440-36-0	E440	0.10	mg/kg	124	116	120	109	118	
arsenic	7440-38-2	E440	0.10	mg/kg	31.3	34.8	41.0	28.0	34.1	
barium	7440-39-3	E440	0.50	mg/kg	521	503	519	587	469	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.34	0.56	0.42	1.86	
bismuth	7440-69-9	E440	0.20	mg/kg	10.1	32.5	10.2	7.96	8.85	
boron	7440-42-8	E440	5.0	mg/kg	188	256	237	185	214	
cadmium	7440-43-9	E440	0.020	mg/kg	13.5	16.2	14.3	10.4	12.0	
calcium	7440-70-2	E440	50	mg/kg	125000	119000	134000	126000	126000	
chromium	7440-47-3	E440	0.50	mg/kg	159	165	175	324	190	
cobalt	7440-48-4	E440	0.10	mg/kg	102	50.9	37.3	60.4	57.3	
copper	7440-50-8	E440	0.50	mg/kg	14200	11600	3150	2750	3830	
iron	7439-89-6	E440	50	mg/kg	60900	66900	63100	86800	75300	
lead	7439-92-1	E440	0.50	mg/kg	1020	493	900	608	952	
lithium	7439-93-2	E440	2.0	mg/kg	24.1	21.7	23.9	26.4	39.4	
magnesium	7439-95-4	E440	20	mg/kg	10600	9990	12000	12300	10800	
manganese	7439-96-5	E440	1.0	mg/kg	874	805	1160	1130	1240	
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	43.3	50.6	46.0	46.6	104	
nickel	7440-02-0	E440	0.50	mg/kg	140	133	339	443	1120	
phosphorus	7723-14-0	E440	50	mg/kg	10700	10600	13000	11000	11100	
potassium	7440-09-7	E440	100	mg/kg	5240	5060	5600	5260	5480	
selenium	7782-49-2	E440	0.20	mg/kg	0.38	0.38	0.38	0.83	0.46	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	----	5.69	
silver	7440-22-4	E440	0.10	mg/kg	6.10	11.1	6.64	4.10	----	
sodium	7440-23-5	E440	50	mg/kg	15600	14400	15500	15300	16400	
strontium	7440-24-6	E440	0.50	mg/kg	321	307	323	328	386	
sulfur	7704-34-9	E440	1000	mg/kg	13600	12400	13600	11900	12900	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2127-A-6	BA2127-A-7	BA2127-A-8	BA2127-A-9	BA2127-A-10
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-006	VA21B3610-007	VA21B3610-008	VA21B3610-009	VA21B3610-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.071	0.054	0.062	0.056	0.053	
tin	7440-31-5	E440	2.0	mg/kg	402	158	716	166	142	
titanium	7440-32-6	E440	1.0	mg/kg	566	540	438	690	549	
tungsten	7440-33-7	E440	0.50	mg/kg	8.50	9.03	9.22	7.81	9.87	
uranium	7440-61-1	E440	0.050	mg/kg	5.31	4.76	5.36	4.73	5.24	
vanadium	7440-62-2	E440	0.20	mg/kg	46.8	44.3	48.5	45.7	48.1	
zinc	7440-66-6	E440	2.0	mg/kg	8630	3820	5380	3380	4870	
zirconium	7440-67-7	E440	1.0	mg/kg	1.0	<1.0	1.0	1.2	1.3	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.2	11.2	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.64	8.92	9.09	8.44	8.92	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	2.86	2.86	2.86	
pH, TCLP final	----	EPP444	0.010	pH units	6.05	6.07	6.24	6.18	6.13	
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	2.06	2.10	2.31	2.00	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.343	0.213	0.171	0.196	0.164	
calcium, TCLP	7440-70-2	E444	10	mg/L	1850	1900	1950	2060	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	0.652	2.16	0.677	1.15	1.13	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.696	0.844	0.384	0.730	0.681	
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	0.27	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	141	153	152	152	157	
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	1.00	1.15	0.77	0.60	1.31	
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	BA2127-A-6	BA2127-A-7	BA2127-A-8	BA2127-A-9	BA2127-A-10
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00	30-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-006	VA21B3610-007	VA21B3610-008	VA21B3610-009	VA21B3610-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	55.1	45.3	55.6	57.1	47.7	
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	BA2127-A-11	BA2127-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	30-Jun-2021 09:00	30-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-011	VA21B3610-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	20.1	18.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	33500	27100	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	120	102	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	31.1	26.7	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	489	390	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.40	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	7.58	11.4	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	181	210	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.5	11.2	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	128000	121000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	165	154	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	105	44.9	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2910	4940	----	----	----	
iron	7439-89-6	E440	50	mg/kg	64800	66000	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	535	1500	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	32.9	21.7	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11200	10500	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	918	732	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	43.1	42.1	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	288	135	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11500	9540	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5380	4910	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.35	0.32	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.36	4.39	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	15400	14500	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	375	292	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	13300	11800	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.061	0.147	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2127-A-11	BA2127-A-12	----	----	----
Client sampling date / time					30-Jun-2021 09:00	30-Jun-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-011	VA21B3610-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	225	121	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	640	268	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	8.60	5.11	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.34	4.82	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	47.7	46.8	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	5680	6830	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.3	1.8	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.2	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.44	8.72	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.10	5.96	----	----	----	
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	2.06	2.13	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.175	0.206	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	1910	1970	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.862	1.78	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.614	1.02	----	----	----	
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	141	153	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.73	1.08	----	----	----	
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	BA2127-A-11	BA2127-A-12	----	----	----
					Client sampling date / time	30-Jun-2021 09:00	30-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B3610-011	VA21B3610-012	-----	-----	-----	
					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	49.5	77.7	----	----	----	
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	: VA21B3610	Page	: 1 of 14
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	: 06-Jul-2021 11:45
PO	: VANCO 0000050390	Issue Date	: 13-Jul-2021 12:45
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.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2127-A-10	E440.Ag	30-Jun-2021	12-Jul-2021	----	----		12-Jul-2021	----	12 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-1	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-10	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-11	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-12	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-2	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-3	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 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		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-4	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-5	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-6	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-7	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-8	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2127-A-9	E510	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	28 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2127-A-1	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2127-A-10	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2127-A-11	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 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		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-12	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-2	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-3	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-4	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-5	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-6	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-7	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-8	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 days	9 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2127-A-9	E440	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	180 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 : Moisture Content by Gravimetry										
LDPE bag BA2127-A-1	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-10	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-11	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-12	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-2	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-3	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-4	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-5	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2127-A-6	E144	30-Jun-2021	----	----	----		08-Jul-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 BA2127-A-7	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2127-A-8	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2127-A-9	E144	30-Jun-2021	----	----	----		08-Jul-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-1	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-10	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-11	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-12	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-2	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-3	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-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 BA2127-A-4	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-5	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-6	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-7	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-8	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2127-A-9	E108	30-Jun-2021	09-Jul-2021	----	----		09-Jul-2021	30 days	9 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2127-A-1	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2127-A-10	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2127-A-11	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	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		
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-12	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-2	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-3	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-4	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-5	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-6	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-7	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-8	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	10 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2127-A-9	E512	07-Jul-2021	----	----	----		10-Jul-2021	----	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) BA2127-A-1	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-10	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-11	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-12	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-2	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-3	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-4	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-5	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2127-A-6	E444	07-Jul-2021	----	----	----		12-Jul-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	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2127-A-7	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2127-A-8	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2127-A-9	E444	07-Jul-2021	----	----	----		12-Jul-2021	180 days	12 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-1	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-10	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-11	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-12	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-2	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-3	EPP444	30-Jun-2021	07-Jul-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) BA2127-A-4	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-5	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-6	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-7	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-8	EPP444	30-Jun-2021	07-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2127-A-9	EPP444	30-Jun-2021	07-Jul-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	239219	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	239218	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	239221	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	239220	1	18	5.5	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	241698	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	239219	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	239218	2	18	11.1	10.0	✔
Moisture Content by Gravimetry	E144	239221	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	239220	1	18	5.5	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	241698	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	240652	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	239219	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	240651	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	239218	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	239221	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	240652	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	240651	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 : VA21B3610

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 : 06-Jul-2021 11:45
Date Analysis Commenced : 07-Jul-2021
Issue Date : 13-Jul-2021 12:45

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), Dee Lee (Analyst), Janice Leung (Supervisor - Organics Extractions), Kevin Duarte (Supervisor - Metals ICP Instrumentation), and Robin Weeks (Team Leader - Metals).

Page : 2 of 11
Work Order : VA21B3610
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: 239220)											
VA21B2673-004	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.86	5.87	0.2%	5%	----
Physical Tests (QC Lot: 239221)											
VA21B3610-001	BA2127-A-1	moisture	----	E144	0.25	%	20.5	21.0	2.24%	20%	----
Metals (QC Lot: 239218)											
VA21B2673-004	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	18700	19500	3.99%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	1.03	0.96	6.72%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	6.89	6.26	9.53%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	53.3	51.3	3.85%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.41	0.02	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	5.2	5.2	0.02	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.192	0.187	2.82%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	5130	5540	7.77%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	34.9	35.2	1.05%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	14.3	13.6	5.05%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	63.5	60.6	4.60%	30%	----
		iron	7439-89-6	E440	50	mg/kg	32800	34500	5.10%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	52.5	48.6	7.72%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	17.2	18.4	6.80%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	8480	9500	11.3%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	763	794	3.97%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.44	0.37	0.07	Diff <2x LOR	----
		nickel	7440-02-0	E440	0.50	mg/kg	28.8	28.5	1.05%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	538	556	3.22%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	620	580	6.10%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.21	<0.20	0.008	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	193	201	8	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	21.3	22.7	6.13%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.052	<0.050	0.002	Diff <2x LOR	----



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: 239218) - continued											
VA21B2673-004	Anonymous	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	1170	1170	0.179%	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	0.250	0.243	0.007	Diff <2x LOR	----
		vanadium	7440-62-2	E440	0.20	mg/kg	87.8	92.1	4.82%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	297	280	6.06%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.7	3.2	0.4	Diff <2x LOR	----
Metals (QC Lot: 239219)											
VA21B3610-001	BA2127-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----



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: 239221)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 239218)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 239218) - continued						
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 239219)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 241698)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 240651)						
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	----
TCLP Metals (QCLot: 240652)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----



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: 239220)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 239221)									
moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Metals (QCLot: 239218)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	89.2	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	113	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	105	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	104	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	100	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	100	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	107	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.4	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	113	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	105	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	97.9	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	108	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	94.4	80.0	120	---



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 239218) - continued									
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	107	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	98.7	80.0	120	----
Metals (QCLot: 239219)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	----
Metals (QCLot: 241698)									
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: 240651)										
VA21B3610-001	BA2127-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	5.2 mg/L	5 mg/L	104	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.1 mg/L	12.5 mg/L	96.6	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.260 mg/L	0.25 mg/L	104	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.2 mg/L	10 mg/L	102	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.275 mg/L	0.25 mg/L	110	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	1.28 mg/L	1.25 mg/L	103	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	2.49 mg/L	2.5 mg/L	99.6	50.0	140	----
		iron, TCLP	7439-89-6	E444	251 mg/L	250 mg/L	100	50.0	140	----
		lead, TCLP	7439-92-1	E444	5.88 mg/L	10 mg/L	58.8	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	274 mg/L	250 mg/L	109	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.54 mg/L	2.5 mg/L	102	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.98 mg/L	5 mg/L	99.7	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.122 mg/L	0.1 mg/L	122	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.49 mg/L	5 mg/L	110	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.78 mg/L	0.75 mg/L	104	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	89.1	50.0	150	----
TCLP Metals (QCLot: 240652)										
VA21B3610-001	BA2127-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	87.7	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: 239218)									
QC-239218-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	99.7	70.0	130	----
QC-239218-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	113	70.0	130	----
QC-239218-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	121	70.0	130	----
QC-239218-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	117	70.0	130	----
QC-239218-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	105	70.0	130	----
QC-239218-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
QC-239218-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
QC-239218-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	98.7	70.0	130	----
QC-239218-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	116	70.0	130	----
QC-239218-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	107	70.0	130	----
QC-239218-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	104	70.0	130	----
QC-239218-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	108	70.0	130	----
QC-239218-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	106	70.0	130	----
QC-239218-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	105	70.0	130	----
QC-239218-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
QC-239218-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
QC-239218-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	107	70.0	130	----
QC-239218-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
QC-239218-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	109	70.0	130	----
QC-239218-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	121	70.0	130	----
QC-239218-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	102	70.0	130	----
QC-239218-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	105	70.0	130	----
QC-239218-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	104	40.0	160	----
QC-239218-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	95.6	70.0	130	----
QC-239218-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	122	70.0	130	----
QC-239218-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
QC-239218-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	112	70.0	130	----
QC-239218-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	107	70.0	130	----
QC-239218-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	96.9	70.0	130	----

Page : 11 of 11
 Work Order : VA21B3610
 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: 239219)									
QC-239219-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	98.2	70.0	130	----

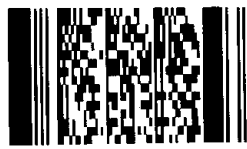


Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company: Covanta Energy		<input type="checkbox"/> Standard <input checked="" type="checkbox"/> Other		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact: Steve McKinney / Dan Skrypnyk		<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
Address: 5150 Riverbend Drive Burnaby BC		Email 1: smckinney@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone: 604-521-1025 Fax: _____		Email 2: rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
<input type="checkbox"/> Yes <input type="checkbox"/> No		Email 3: dskrypnyk@covanta.com		Analysis Request	
		brent.kirkpatrick@metrovancover.org			
		Sarah.Welman@metrovancover.org			

Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)									
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 #:		MET-TCLP-VA (all metals, Hg)		MOISTURE		Chrome 6		MET-CSR+FULL-VA (all metals)		Number of Containers	
Phone: _____ Fax: _____		ALS Contact: _____ Sampler: _____											
Lab Work Order # (lab use only) 3610													

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)					Number of Containers	
1	BA2127-A-1	30-Jun-21	9:00	Soil	X	X		X						1
2	BA2127-A-2	30-Jun-21	9:00	Soil	X	X		X						1
3	BA2127-A-3	30-Jun-21	9:00	Soil	X	X		X						1
4	BA2127-A-4	30-Jun-21	9:00	Soil	X	X		X						1
5	BA2127-A-5	30-Jun-21	9:00	Soil	X	X		X						1
6	BA2127-A-6	30-Jun-21	9:00	Soil	X	X		X						1
7	BA2127-A-7	30-Jun-21	9:00	Soil	X	X		X						1
8	BA2127-A-8	30-Jun-21	9:00	Soil	X	X		X						1
9	BA2127-A-9	30-Jun-21	9:00	Soil	X	X		X						1
10	BA2127-A-10	30-Jun-21	9:00	Soil	X	X		X						1
11	BA2127-A-11	30-Jun-21	9:00	Soil	X	X		X						1
12	BA2127-A-12	30-Jun-21	9:00	Soil	X	X		X						1

**Environmental Division
 Vancouver
 Work Order Reference
 VA21B3610**



Telephone: +1 604 253 4188

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by: <i>[Signature]</i>	Date (dd-mmm-yy): 6-Jul-21	Time (hh-mm): 0800	Received by: _____	Date: _____	Time: _____	Temperature: 24°C	Verified by: <i>[Signature]</i>	Date: July 5 th	Time: 11:45	Observations: Yes / No ? If Yes add SIF

2 buckets