

Bottom Ash Data

2021 Week 35

The following analytical report represents bottom ash composite results for week 35 of 2021 (August 22, 2021 to August 28, 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 : **VA21B8621**
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 : 31-Aug-2021 10:30
Date Analysis Commenced : 03-Sep-2021
Issue Date : 10-Sep-2021 10:19

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
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	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	BA2135A-1	BA2135A-2	BA2135A-3	BA2135A-4	BA2135A-5
(Matrix: Soil/Solid)					Client sampling date / time	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-001	VA21B8621-002	VA21B8621-003	VA21B8621-004	VA21B8621-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.7	21.2	20.9	18.2	21.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.5	10.4	10.4	10.3	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	32800	38700	36800	36900	41000	
antimony	7440-36-0	E440	0.10	mg/kg	193	137	243	148	272	
arsenic	7440-38-2	E440	0.10	mg/kg	38.8	32.1	39.6	41.0	31.1	
barium	7440-39-3	E440	0.50	mg/kg	654	554	497	475	544	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.36	0.39	0.41	0.33	
bismuth	7440-69-9	E440	0.20	mg/kg	8.68	9.30	9.89	12.1	12.8	
boron	7440-42-8	E440	5.0	mg/kg	233	208	192	174	359	
cadmium	7440-43-9	E440	0.020	mg/kg	10.9	9.78	11.4	19.4	9.89	
calcium	7440-70-2	E440	50	mg/kg	133000	131000	136000	139000	124000	
chromium	7440-47-3	E440	0.50	mg/kg	156	154	170	198	144	
cobalt	7440-48-4	E440	0.10	mg/kg	58.6	42.5	51.0	54.2	450	
copper	7440-50-8	E440	0.50	mg/kg	38600	2410	5950	8490	3540	
iron	7439-89-6	E440	50	mg/kg	63500	44500	63100	61800	60500	
lead	7439-92-1	E440	0.50	mg/kg	2290	597	3200	734	975	
lithium	7439-93-2	E440	2.0	mg/kg	23.3	22.9	22.9	22.8	114	
magnesium	7439-95-4	E440	20	mg/kg	13200	12100	13100	12400	12200	
manganese	7439-96-5	E440	1.0	mg/kg	1040	900	902	1200	998	
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	216	227	218	188	158	
nickel	7440-02-0	E440	0.50	mg/kg	387	125	223	423	358	
phosphorus	7723-14-0	E440	50	mg/kg	10600	11000	10600	11200	9610	
potassium	7440-09-7	E440	100	mg/kg	6740	6430	6500	6750	6300	
selenium	7782-49-2	E440	0.20	mg/kg	0.52	0.36	0.55	0.37	0.39	
silver	7440-22-4	E440	0.10	mg/kg	6.85	5.52	11.5	6.69	7.72	
sodium	7440-23-5	E440	50	mg/kg	17800	17300	17100	16700	16000	
strontium	7440-24-6	E440	0.50	mg/kg	306	327	387	322	322	
sulfur	7704-34-9	E440	1000	mg/kg	13800	14500	15100	16400	13700	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2135A-1	BA2135A-2	BA2135A-3	BA2135A-4	BA2135A-5
Client sampling date / time					25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-001	VA21B8621-002	VA21B8621-003	VA21B8621-004	VA21B8621-005	
					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	162	109	120	122	89.4	
titanium	7440-32-6	E440	1.0	mg/kg	517	666	436	515	683	
tungsten	7440-33-7	E440	0.50	mg/kg	12.4	11.9	11.7	13.6	11.2	
uranium	7440-61-1	E440	0.050	mg/kg	2.03	2.04	2.15	2.27	1.91	
vanadium	7440-62-2	E440	0.20	mg/kg	29.7	29.7	34.0	39.9	47.6	
zinc	7440-66-6	E440	2.0	mg/kg	4500	7340	4960	7010	5290	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.5	1.9	1.8	1.8	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.6	11.6	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.12	9.14	9.40	9.00	9.45	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.28	6.42	6.47	6.31	6.54	
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	1.96	2.10	1.91	2.11	1.88	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	1.00	0.384	0.243	0.357	0.166	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	2040	2090	2070	1880	
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	0.984	1.29	0.872	0.961	0.828	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.970	1.24	0.876	1.22	0.654	
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	0.26	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	140	137	133	147	124	
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	0.74	0.49	0.62	0.49	0.47	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2135A-1	BA2135A-2	BA2135A-3	BA2135A-4	BA2135A-5
Client sampling date / time					25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-001	VA21B8621-002	VA21B8621-003	VA21B8621-004	VA21B8621-005	
					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	42.4	37.7	38.7	46.8	27.2	27.2
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 (Matrix: Soil/Solid)					Client sample ID	BA2135A-6	BA2135A-7	BA2135A-8	BA2135A-9	BA2135A-10
Client sampling date / time					25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-006	VA21B8621-007	VA21B8621-008	VA21B8621-009	VA21B8621-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.0	22.1	18.4	20.1	16.2	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.5	10.6	10.5	10.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	32800	31700	29300	30300	38400	
antimony	7440-36-0	E440	0.10	mg/kg	122	146	142	176	147	
arsenic	7440-38-2	E440	0.10	mg/kg	30.6	34.3	50.6	30.0	33.4	
barium	7440-39-3	E440	0.50	mg/kg	478	543	592	583	521	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.37	0.35	0.46	0.36	
bismuth	7440-69-9	E440	0.20	mg/kg	7.46	9.39	9.45	9.64	10.7	
boron	7440-42-8	E440	5.0	mg/kg	175	190	314	197	169	
cadmium	7440-43-9	E440	0.020	mg/kg	9.64	14.2	10.6	8.63	11.6	
calcium	7440-70-2	E440	50	mg/kg	127000	131000	132000	129000	133000	
chromium	7440-47-3	E440	0.50	mg/kg	155	331	156	136	164	
cobalt	7440-48-4	E440	0.10	mg/kg	33.1	79.1	88.5	78.4	85.6	
copper	7440-50-8	E440	0.50	mg/kg	1600	6520	6400	16900	3220	
iron	7439-89-6	E440	50	mg/kg	69800	73600	59400	55100	62200	
lead	7439-92-1	E440	0.50	mg/kg	2640	717	9720	1940	1010	
lithium	7439-93-2	E440	2.0	mg/kg	22.9	26.8	26.1	22.8	25.3	
magnesium	7439-95-4	E440	20	mg/kg	12600	12000	12700	12200	11800	
manganese	7439-96-5	E440	1.0	mg/kg	3990	974	1040	755	1030	
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	218	228	232	226	207	
nickel	7440-02-0	E440	0.50	mg/kg	190	331	153	149	426	
phosphorus	7723-14-0	E440	50	mg/kg	8570	10700	10500	10100	10500	
potassium	7440-09-7	E440	100	mg/kg	6080	6460	5710	5990	6770	
selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.44	0.44	0.36	0.34	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	4.49	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	7.48	----	17.7	5.75	5.28	
sodium	7440-23-5	E440	50	mg/kg	16000	16500	14800	15800	17100	
strontium	7440-24-6	E440	0.50	mg/kg	299	319	427	305	328	
sulfur	7704-34-9	E440	1000	mg/kg	14200	15300	14200	13800	15300	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2135A-6	BA2135A-7	BA2135A-8	BA2135A-9	BA2135A-10
Client sampling date / time					25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-006	VA21B8621-007	VA21B8621-008	VA21B8621-009	VA21B8621-010	
					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	105	152	166	111	145	
titanium	7440-32-6	E440	1.0	mg/kg	372	481	399	334	465	
tungsten	7440-33-7	E440	0.50	mg/kg	11.5	16.7	16.9	10.9	12.0	
uranium	7440-61-1	E440	0.050	mg/kg	1.96	2.21	2.07	1.96	2.27	
vanadium	7440-62-2	E440	0.20	mg/kg	30.0	30.0	32.1	30.6	31.7	
zinc	7440-66-6	E440	2.0	mg/kg	4150	5380	4430	6540	4060	
zirconium	7440-67-7	E440	1.0	mg/kg	1.5	1.2	1.2	1.0	1.2	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.6	11.6	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.09	9.03	9.33	9.51	9.18	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.26	6.10	6.08	6.04	6.19	
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	2.00	1.99	2.06	2.00	2.13	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.154	0.162	0.245	0.157	0.199	
calcium, TCLP	7440-70-2	E444	10	mg/L	2070	2050	2020	2080	2100	
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	0.775	0.675	1.27	1.13	1.07	
copper, TCLP	7440-50-8	E444	0.050	mg/L	2.06	0.550	1.50	1.16	0.853	
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	0.33	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	142	134	140	140	139	
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	1.08	0.58	0.46	0.67	0.64	
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	BA2135A-6	BA2135A-7	BA2135A-8	BA2135A-9	BA2135A-10
Client sampling date / time					25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00	25-Aug-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-006	VA21B8621-007	VA21B8621-008	VA21B8621-009	VA21B8621-010	
					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	52.2	59.3	66.4	38.8	44.8	
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	BA2135A-11	BA2135A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	25-Aug-2021 09:00	25-Aug-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-011	VA21B8621-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	18.7	18.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	29000	35800	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	155	140	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	51.0	32.3	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	606	492	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.32	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	8.92	8.38	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	215	160	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	9.91	10.1	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	131000	120000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	185	173	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	272	95.4	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	4100	6830	----	----	----	
iron	7439-89-6	E440	50	mg/kg	70200	71600	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1860	762	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	29.4	23.8	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	13500	12600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1020	1480	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	433	172	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	369	133	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11000	10300	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	6450	5880	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.29	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.48	9.93	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	16600	15500	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	1360	288	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	14400	13400	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2135A-11	BA2135A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	25-Aug-2021 09:00	25-Aug-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-011	VA21B8621-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	109	200	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	491	454	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	12.6	10.7	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	2.14	1.87	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	32.0	27.8	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	4660	5200	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.0	1.6	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.72	9.40	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.45	6.10	----	----	----	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.99	2.10	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.134	0.186	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2050	2080	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.793	0.874	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.915	0.742	----	----	----	
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	1.41	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	132	138	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.40	0.43	----	----	----	
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	BA2135A-11	BA2135A-12	----	----	----
					Client sampling date / time	25-Aug-2021 09:00	25-Aug-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B8621-011	VA21B8621-012	-----	-----	-----	
					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	30.6	55.4	----	----	----	
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	: VA21B8621	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	: 31-Aug-2021 10:30
PO	: VANCO 0000050390	Issue Date	: 10-Sep-2021 10:19
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	VA21B8621-001	BA2135A-1	antimony	7440-36-0	E440	44.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	copper	7440-50-8	E440	179 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	lead	7439-92-1	E440	114 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	manganese	7439-96-5	E440	63.6 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	nickel	7440-02-0	E440	89.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	strontium	7440-24-6	E440	72.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	tin	7440-31-5	E440	53.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B8621-001	BA2135A-1	zinc	7440-66-6	E440	61.9 % 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 : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2135A-7	E440.Ag	25-Aug-2021	09-Sep-2021	----	----		09-Sep-2021	----	15 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-1	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-10	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-11	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-12	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-2	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-3	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-4	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-5	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-6	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-7	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-8	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2135A-9	E510	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	28 days	14 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2135A-1	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2135A-10	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2135A-11	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-12	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-2	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-3	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-4	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-5	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-6	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-7	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-8	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2135A-9	E440	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-1	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-10	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-11	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-12	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-2	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-3	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-4	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-5	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-6	E144	25-Aug-2021	----	----	----		04-Sep-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 BA2135A-7	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-8	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2135A-9	E144	25-Aug-2021	----	----	----		04-Sep-2021	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-1	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-10	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-11	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-12	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-2	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2135A-3	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✔



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-4	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-5	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-6	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-7	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-8	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2135A-9	E108	25-Aug-2021	08-Sep-2021	----	----		08-Sep-2021	30 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-1	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-10	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-11	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-12	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-2	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-3	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-4	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-5	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-6	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-7	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-8	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2135A-9	E512	03-Sep-2021	----	----	----		08-Sep-2021	28 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-1	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-10	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-11	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-12	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-2	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-3	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-4	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-5	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2135A-6	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2135A-7	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2135A-8	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2135A-9	E444	03-Sep-2021	----	----	----		08-Sep-2021	180 days	14 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-1	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-10	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-11	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-12	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-2	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-3	EPP444	25-Aug-2021	03-Sep-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: 28 day HT (e.g. Hg, CrVI) BA2135A-4	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-5	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-6	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-7	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-8	EPP444	25-Aug-2021	03-Sep-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2135A-9	EPP444	25-Aug-2021	03-Sep-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	284318	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	284319	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	284321	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	284320	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	287819	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	284318	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	284319	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	284321	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	284320	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	287819	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	286641	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	284318	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	286642	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	284319	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	284321	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	286641	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	286642	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.
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



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with 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 : VA21B8621

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 : 31-Aug-2021 10:30
Date Analysis Commenced : 03-Sep-2021
Issue Date : 10-Sep-2021 10:19

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), Caleb Deroche (Lab Analyst), Janice Leung (Supervisor - Organics Instrumentation), Kevin Duarte (Supervisor - Metals ICP Instrumentation), and Shaneel Dayal (Analyst).

Page : 2 of 11
Work Order : VA21B8621
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: 284320)											
VA21B8621-001	BA2135A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.5	1.1%	5%	----
Physical Tests (QC Lot: 284321)											
VA21B8621-001	BA2135A-1	moisture	----	E144	0.25	%	19.7	18.3	7.02%	20%	----
Metals (QC Lot: 284318)											
VA21B8621-001	BA2135A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 284319)											
VA21B8621-001	BA2135A-1	aluminum	7429-90-5	E440	50	mg/kg	32800	41800	24.2%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	193	122	44.7%	30%	DUP-H
		arsenic	7440-38-2	E440	0.10	mg/kg	38.8	30.9	22.6%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	654	532	20.7%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.37	0.04	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	8.68	7.38	16.2%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	233	189	21.0%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	10.9	8.66	23.2%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	133000	127000	4.86%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	156	152	2.13%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	58.6	50.9	14.0%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	38600	2150	179%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	63500	64200	1.02%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	2290	630	114%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	23.3	23.4	0.678%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	13200	11900	10.6%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1040	2020	63.6%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	216	198	8.79%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	387	148	89.2%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	10600	10700	0.668%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	6740	5830	14.6%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.52	0.38	0.14	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	6.85	5.00	31.2%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	17800	16400	8.67%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	306	656	72.7%	40%	DUP-H



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 284319) - continued											
VA21B8621-001	BA2135A-1	sulfur	7704-34-9	E440	1000	mg/kg	13800	12800	7.22%	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	162	94.0	53.4%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	517	380	30.5%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	12.4	12.2	0.960%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	2.03	1.94	4.57%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	29.7	37.5	23.3%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4500	8530	61.9%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.2	2.2	1.1	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: 284321)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 284318)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 284319)						
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: 284319) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 287819)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 286641)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 286642)						
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: 284320)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 284321)									
moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
Metals (QCLot: 284318)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	104	80.0	120	----
Metals (QCLot: 284319)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	118	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	118	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	95.6	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	102	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	100.0	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	98.4	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	111	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	97.7	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	114	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	107	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	114	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	110	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	111	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	116	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: 284319) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.2	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	106	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	97.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	108	80.0	120	----
Metals (QCLot: 287819)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	101	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: 286641)										
VA21B8621-001	BA2135A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	98.6	50.0	140	----
TCLP Metals (QCLot: 286642)										
VA21B8621-001	BA2135A-1	antimony, TCLP	7440-36-0	E444	6.1 mg/L	5 mg/L	122	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	101	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.6 mg/L	12.5 mg/L	108	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.242 mg/L	0.25 mg/L	96.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.28 mg/L	10 mg/L	92.8	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.20 mg/L	1.25 mg/L	95.7	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	2.31 mg/L	2.5 mg/L	92.4	50.0	140	----
		iron, TCLP	7439-89-6	E444	241 mg/L	250 mg/L	96.4	50.0	140	----
		lead, TCLP	7439-92-1	E444	11.8 mg/L	10 mg/L	118	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	262 mg/L	250 mg/L	105	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.41 mg/L	2.5 mg/L	96.4	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.08 mg/L	5 mg/L	102	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.118 mg/L	0.1 mg/L	118	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.8 mg/L	5 mg/L	116	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.75 mg/L	5 mg/L	115	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	96.5	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	106	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: 284318)									
QC-284318-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	96.3	70.0	130	----
Metals (QCLot: 284319)									
QC-284319-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	113	70.0	130	----
QC-284319-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	112	70.0	130	----
QC-284319-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-284319-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-284319-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	101	70.0	130	----
QC-284319-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	109	40.0	160	----
QC-284319-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
QC-284319-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	108	70.0	130	----
QC-284319-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	107	70.0	130	----
QC-284319-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	105	70.0	130	----
QC-284319-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	102	70.0	130	----
QC-284319-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-284319-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	113	70.0	130	----
QC-284319-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	102	70.0	130	----
QC-284319-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	114	70.0	130	----
QC-284319-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	106	70.0	130	----
QC-284319-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	----
QC-284319-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	112	70.0	130	----
QC-284319-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	110	70.0	130	----
QC-284319-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	108	70.0	130	----
QC-284319-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	105	70.0	130	----
QC-284319-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	115	70.0	130	----
QC-284319-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	106	40.0	160	----
QC-284319-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
QC-284319-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	107	70.0	130	----
QC-284319-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	108	70.0	130	----
QC-284319-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----



Sub-Matrix: **Soil/Solid**

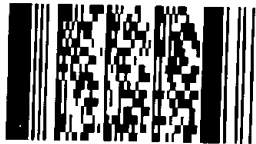
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 284319) - continued									
QC-284319-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	100	70.0	130	----
QC-284319-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	97.7	70.0	130	----



Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="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 Burnaby BC	Email 1:	smckinney@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
		Email 2:	rjohnson4@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Phone:	604-521-1025	Email 3:	dskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT

Phone:	604-521-1025	Fax:			Analysis Request										
	<input type="checkbox"/> Yes		<input type="checkbox"/> No												
				brent.kirkpatrick@metrovancover.org											
				Sarah.Wellman@metrovancover.org											

Invoice To	Same as Report ?	Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)										
Hardcopy of Invoice with Report?	<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:														
Phone:		Fax:												
			Quote #:											

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												
BA2135-A-1	Environmental Division Vancouver Work Order Reference VA21B8621  Telephone : +1 604 253 4188	25-Aug-21	9:00	Soil	X	X		X												1	
BA2135-A-2		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-3		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-4		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-5		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-6		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-7		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-8		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-9		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-10		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-11		25-Aug-21	9:00	Soil	X	X		X													1
BA2135-A-12		25-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)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	31-Aug-21	0800				20, 10C	JCP	31 Aug 10:30 AM		Yes / No ? If Yes add SIF
GENF 20.00 Front										