

Bottom Ash Data

2021 Week 31

The following analytical report represents bottom ash composite results for week 31 of 2021 (July 25, 2021 to July 31, 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 : **VA21B5919**
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 : 03-Aug-2021 11:20
Date Analysis Commenced : 05-Aug-2021
Issue Date : 11-Aug-2021 12:28

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Sristika Chand	Lab 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	BA2131-A-1	BA2131-A-2	BA2131-A-3	BA2131-A-4	BA2131-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-001	VA21B5919-002	VA21B5919-003	VA21B5919-004	VA21B5919-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	17.3	19.1	20.8	20.5	20.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	11.0	11.3	11.1	10.9	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	36700	29300	29700	24800	28600	
antimony	7440-36-0	E440	0.10	mg/kg	72.9	107	97.0	95.1	99.1	
arsenic	7440-38-2	E440	0.10	mg/kg	21.8	28.0	29.0	25.5	25.8	
barium	7440-39-3	E440	0.50	mg/kg	795	749	614	529	678	
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.41	0.41	0.36	0.36	
bismuth	7440-69-9	E440	0.20	mg/kg	4.01	5.82	5.24	5.11	5.19	
boron	7440-42-8	E440	5.0	mg/kg	164	250	239	232	223	
cadmium	7440-43-9	E440	0.020	mg/kg	4.84	5.84	13.9	6.57	8.99	
calcium	7440-70-2	E440	50	mg/kg	125000	142000	140000	134000	124000	
chromium	7440-47-3	E440	0.50	mg/kg	250	224	153	195	194	
cobalt	7440-48-4	E440	0.10	mg/kg	76.0	95.7	107	72.2	301	
copper	7440-50-8	E440	0.50	mg/kg	6060	7970	2420	13900	3350	
iron	7439-89-6	E440	50	mg/kg	86600	61700	56500	83800	80500	
lead	7439-92-1	E440	0.50	mg/kg	1020	681	668	1160	864	
lithium	7439-93-2	E440	2.0	mg/kg	22.1	22.1	26.4	23.3	39.2	
magnesium	7439-95-4	E440	20	mg/kg	10400	11800	13000	11400	10800	
manganese	7439-96-5	E440	1.0	mg/kg	1340	5020	773	949	1200	
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	21.2	22.9	20.3	26.6	25.0	
nickel	7440-02-0	E440	0.50	mg/kg	255	209	165	273	244	
phosphorus	7723-14-0	E440	50	mg/kg	11800	10700	11600	10600	10200	
potassium	7440-09-7	E440	100	mg/kg	4040	5030	4990	4470	4540	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.30	0.30	0.34	0.33	
silver	7440-22-4	E440	0.10	mg/kg	3.06	5.88	3.75	4.94	3.87	
sodium	7440-23-5	E440	50	mg/kg	12400	16100	16200	13800	13600	
strontium	7440-24-6	E440	0.50	mg/kg	265	322	299	298	288	
sulfur	7704-34-9	E440	1000	mg/kg	9100	10900	10900	10500	10200	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2131-A-1	BA2131-A-2	BA2131-A-3	BA2131-A-4	BA2131-A-5
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-001	VA21B5919-002	VA21B5919-003	VA21B5919-004	VA21B5919-005	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	123	204	582	131	245	
titanium	7440-32-6	E440	1.0	mg/kg	599	685	384	240	596	
tungsten	7440-33-7	E440	0.50	mg/kg	7.76	10.4	9.26	7.94	8.69	
uranium	7440-61-1	E440	0.050	mg/kg	1.99	2.44	2.53	2.10	2.27	
vanadium	7440-62-2	E440	0.20	mg/kg	36.2	37.5	36.9	34.9	35.6	
zinc	7440-66-6	E440	2.0	mg/kg	8840	6500	3030	3850	3940	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	<1.0	1.1	1.8	1.2	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	11.7	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.04	8.48	8.51	7.89	8.45	
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	6.10	6.09	6.41	6.32	6.20	
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	2.15	2.04	2.30	2.27	2.10	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.094	0.096	0.105	0.082	0.096	
calcium, TCLP	7440-70-2	E444	10	mg/L	2140	2070	2210	2180	2040	
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	0.871	1.36	0.793	0.814	1.17	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.753	1.47	0.806	0.723	0.882	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	137	141	146	141	136	
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	0.63	0.68	0.52	0.43	0.52	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2131-A-1	BA2131-A-2	BA2131-A-3	BA2131-A-4	BA2131-A-5
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-001	VA21B5919-002	VA21B5919-003	VA21B5919-004	VA21B5919-005	
TCLP Metals					Result	Result	Result	Result	Result	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	44.1	76.1	20.3	23.9	35.7	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2131-A-6	BA2131-A-7	BA2131-A-8	BA2131-A-9	BA2131-A-10
(Matrix: Soil/Solid)					Client sampling date / time	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-006	VA21B5919-007	VA21B5919-008	VA21B5919-009	VA21B5919-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.7	18.4	19.3	18.0	17.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	11.1	11.3	11.0	11.0	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	37700	33300	31000	29200	39400	
antimony	7440-36-0	E440	0.10	mg/kg	92.5	74.3	267	107	111	
arsenic	7440-38-2	E440	0.10	mg/kg	28.3	25.7	33.5	30.2	26.2	
barium	7440-39-3	E440	0.50	mg/kg	753	687	611	722	694	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.35	0.37	0.38	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	4.90	5.86	8.57	22.4	5.54	
boron	7440-42-8	E440	5.0	mg/kg	268	206	226	182	258	
cadmium	7440-43-9	E440	0.020	mg/kg	6.94	5.81	7.00	6.17	13.0	
calcium	7440-70-2	E440	50	mg/kg	126000	123000	141000	138000	132000	
chromium	7440-47-3	E440	0.50	mg/kg	161	2390	177	213	145	
cobalt	7440-48-4	E440	0.10	mg/kg	28.0	746	172	235	28.7	
copper	7440-50-8	E440	0.50	mg/kg	2850	1430	10000	2030	7100	
iron	7439-89-6	E440	50	mg/kg	73000	105000	88000	67100	64700	
lead	7439-92-1	E440	0.50	mg/kg	2120	369	3520	2560	3410	
lithium	7439-93-2	E440	2.0	mg/kg	23.6	70.7	26.3	34.9	21.4	
magnesium	7439-95-4	E440	20	mg/kg	10500	9680	11300	11600	11500	
manganese	7439-96-5	E440	1.0	mg/kg	2240	5730	910	860	932	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0916	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	22.6	43.4	20.0	32.8	23.0	
nickel	7440-02-0	E440	0.50	mg/kg	102	1080	193	205	107	
phosphorus	7723-14-0	E440	50	mg/kg	10200	8390	12300	10800	9300	
potassium	7440-09-7	E440	100	mg/kg	4820	4000	4580	4720	4420	
selenium	7782-49-2	E440	0.20	mg/kg	0.25	0.49	0.37	0.33	0.32	
silver	7440-22-4	E440	0.10	mg/kg	7.57	3.56	6.50	5.94	3.96	
sodium	7440-23-5	E440	50	mg/kg	14000	12200	14000	14900	13600	
strontium	7440-24-6	E440	0.50	mg/kg	291	904	365	320	293	
sulfur	7704-34-9	E440	1000	mg/kg	11100	9300	12100	11400	10700	
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	145	87.7	173	169	126	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2131-A-6	BA2131-A-7	BA2131-A-8	BA2131-A-9	BA2131-A-10
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-006	VA21B5919-007	VA21B5919-008	VA21B5919-009	VA21B5919-010	
					Result	Result	Result	Result	Result	
Metals										
titanium	7440-32-6	E440	1.0	mg/kg	798	1190	384	403	880	
tungsten	7440-33-7	E440	0.50	mg/kg	28.6	8.97	9.34	8.29	14.7	
uranium	7440-61-1	E440	0.050	mg/kg	2.29	1.93	2.22	2.25	2.23	
vanadium	7440-62-2	E440	0.20	mg/kg	39.2	55.3	36.2	40.7	40.9	
zinc	7440-66-6	E440	2.0	mg/kg	3870	2490	4430	3860	3710	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.5	1.0	<1.0	1.3	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	11.6	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.67	8.54	8.34	8.44	8.40	
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	6.25	6.29	6.31	6.16	6.04	
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	2.24	2.36	2.21	2.28	2.02	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.143	0.098	0.106	0.087	0.132	
calcium, TCLP	7440-70-2	E444	10	mg/L	2150	2150	2090	2090	1960	
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	1.30	0.863	0.878	0.796	2.16	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.713	0.799	0.931	1.10	0.697	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	134	141	136	131	127	
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	0.51	0.50	0.42	0.65	0.47	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	22.9	27.5	28.2	35.5	37.6	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2131-A-6	BA2131-A-7	BA2131-A-8	BA2131-A-9	BA2131-A-10
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00	28-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-006	VA21B5919-007	VA21B5919-008	VA21B5919-009	VA21B5919-010	
TCLP Metals					Result	Result	Result	Result	Result	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2131-A-11	BA2131-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	28-Jul-2021 09:00	28-Jul-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-011	VA21B5919-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
moisture	----	E144	0.25	%	17.9	17.4	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.1	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	27800	28400	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	88.4	88.4	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	27.2	30.5	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	730	656	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.41	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	4.52	8.07	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	211	251	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	8.76	20.5	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	133000	141000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	167	238	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	31.2	57.0	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	4770	7680	----	----	----	
iron	7439-89-6	E440	50	mg/kg	67600	78100	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	403	470	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	18.9	20.9	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	10000	12500	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	745	988	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	19.3	24.3	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	125	276	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	12000	10500	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4420	4490	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.30	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	4.50	6.79	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	13700	14100	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	288	308	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	10800	11100	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	
tin	7440-31-5	E440	2.0	mg/kg	275	90.4	----	----	----	



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2131-A-11	BA2131-A-12	----	----	----
Client sampling date / time					28-Jul-2021 09:00	28-Jul-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-011	VA21B5919-012	-----	-----	-----
					Result	Result	---	---	---
Metals									
titanium	7440-32-6	E440	1.0	mg/kg	568	402	---	---	---
tungsten	7440-33-7	E440	0.50	mg/kg	15.0	8.48	---	---	---
uranium	7440-61-1	E440	0.050	mg/kg	2.26	2.37	---	---	---
vanadium	7440-62-2	E440	0.20	mg/kg	36.9	41.6	---	---	---
zinc	7440-66-6	E440	2.0	mg/kg	5270	5330	---	---	---
zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	1.4	---	---	---
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	---	---	---
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.51	8.28	---	---	---
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.86	2.86	---	---	---
pH, TCLP final	----	EPP444	0.010	pH units	6.14	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	2.12	1.91	---	---	---
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.146	0.088	---	---	---
calcium, TCLP	7440-70-2	E444	10	mg/L	2050	1950	---	---	---
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.635	1.06	---	---	---
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.901	0.982	---	---	---
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	130	127	---	---	---
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.59	0.48	---	---	---
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	---	---	---
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	---	---	---
zinc, TCLP	7440-66-6	E444	0.50	mg/L	30.8	47.6	---	---	---



Analytical Results

Sub-Matrix: Soil					Client sample ID		BA2131-A-11	BA2131-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time		28-Jul-2021 09:00	28-Jul-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B5919-011	VA21B5919-012	-----	-----	-----	-----	-----
TCLP Metals					Result	Result	----	----	----	----	----
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	: VA21B5919	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	: 03-Aug-2021 11:20
PO	: VANCO 0000050390	Issue Date	: 11-Aug-2021 12:28
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No 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

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

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	VA21B5919-001	BA2131-A-1	chromium	7440-47-3	E440	31.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	cobalt	7440-48-4	E440	39.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	copper	7440-50-8	E440	136 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	nickel	7440-02-0	E440	186 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	silver	7440-22-4	E440	138 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	strontium	7440-24-6	E440	72.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	tin	7440-31-5	E440	114 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	titanium	7440-32-6	E440	42.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5919-001	BA2131-A-1	tungsten	7440-33-7	E440	62.8 % 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.

Reference Material (RM) Sample								
Metals	QC-MRG2-2612390 03	----	uranium	7440-61-1	E440	138 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-1	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-10	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-11	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-12	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-2	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-3	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-4	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 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 BA2131-A-5	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-6	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-7	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-8	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2131-A-9	E510	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2131-A-1	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2131-A-10	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2131-A-11	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2131-A-12	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 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 BA2131-A-2	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-3	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-4	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-5	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-6	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-7	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-8	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2131-A-9	E440	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	180 days	13 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2131-A-1	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-10	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-11	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-12	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-2	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-3	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-4	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-5	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-6	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2131-A-7	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2131-A-8	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2131-A-9	E144	28-Jul-2021	----	----	----		07-Aug-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-1	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-10	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-11	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-12	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-2	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-3	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-4	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-5	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-6	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-7	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-8	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2131-A-9	E108	28-Jul-2021	09-Aug-2021	----	----		10-Aug-2021	30 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2131-A-1	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2131-A-10	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2131-A-11	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2131-A-12	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	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 : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-2	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-3	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-4	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-5	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-6	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-7	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-8	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2131-A-9	E512	05-Aug-2021	----	----	----		09-Aug-2021	----	12 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2131-A-1	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-10	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-11	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-12	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-2	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-3	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-4	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-5	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-6	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2131-A-7	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2131-A-8	E444	05-Aug-2021	----	----	----		09-Aug-2021	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2131-A-9	E444	05-Aug-2021	----	----	----		09-Aug-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) BA2131-A-1	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-10	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-11	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-12	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-2	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-3	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-4	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-5	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-6	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-7	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-8	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2131-A-9	EPP444	28-Jul-2021	05-Aug-2021	----	----		----	----	----		

Legend & Qualifier Definitions

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



Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	261239	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	261240	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	261242	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	261241	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	261239	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	261240	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	261242	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	261241	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	262088	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	261239	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	262087	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	261240	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	261242	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	262088	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	262087	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.

Page : 15 of 15
Work Order : VA21B5919
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 : VA21B5919

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 : 03-Aug-2021 11:20
Date Analysis Commenced : 05-Aug-2021
Issue Date : 11-Aug-2021 12:28

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Angela Ren (Team Leader - Metals), Dee Lee (Analyst), Kevin Duarte (Supervisor - Metals ICP Instrumentation), Ophelia Chiu (Department Manager - Organics), and Sristika Chand (Lab Analyst).

Page : 2 of 11
Work Order : VA21B5919
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: 261241)											
VA21B5919-001	BA2131-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	10.9	0.4%	5%	----
Physical Tests (QC Lot: 261242)											
VA21B5919-001	BA2131-A-1	moisture	----	E144	0.25	%	17.3	18.6	6.96%	20%	----
Metals (QC Lot: 261239)											
VA21B5919-001	BA2131-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 261240)											
VA21B5919-001	BA2131-A-1	aluminum	7429-90-5	E440	50	mg/kg	36700	25900	34.5%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	72.9	94.6	25.9%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	21.8	27.8	24.2%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	795	630	23.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.35	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	4.01	4.84	18.6%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	164	186	12.5%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	4.84	5.91	19.9%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	125000	132000	5.16%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	250	343	31.2%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	76.0	51.0	39.3%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	6060	31500	136%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	86600	90500	4.40%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	1020	718	34.8%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	22.1	22.5	1.64%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	10400	11200	7.65%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1340	1120	18.2%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	21.2	28.1	27.7%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	255	7090	186%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	11800	10300	13.0%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4040	4590	12.8%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.40	0.11	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	3.06	16.7	138%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	12400	13900	11.4%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	265	564	72.2%	40%	DUP-H



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 261240) - continued											
VA21B5919-001	BA2131-A-1	sulfur	7704-34-9	E440	1000	mg/kg	9100	10800	16.9%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.078	0.028	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	123	447	114%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	599	388	42.8%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	7.76	14.9	62.8%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	1.99	2.14	7.43%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	36.2	36.0	0.425%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	8840	10700	19.4%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.2	<1.0	0.2	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: 261242)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 261239)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 261240)						
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: 261240) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	---
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	---
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	---
zinc	7440-66-6	E440	2	mg/kg	<2.0	---
zirconium	7440-67-7	E440	1	mg/kg	<1.0	---
TCLP Metals (QCLot: 262087)						
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: 262088)						
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: 261241)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 261242)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 261239)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	106	80.0	120	----
Metals (QCLot: 261240)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	85.2	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	93.0	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	95.5	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	95.2	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.2	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	92.8	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	91.9	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.4	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.4	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	92.2	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	92.4	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	87.9	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	95.8	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	94.2	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	96.7	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	94.5	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.0	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	90.4	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	95.5	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	92.4	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.1	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	93.0	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	95.9	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	100	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 261240) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.8	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	91.7	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	88.6	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	91.4	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	94.3	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	94.9	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	92.4	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 $\geq 1 \times$ 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: 262087)										
VA21B5919-001	BA2131-A-1	antimony, TCLP	7440-36-0	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.6 mg/L	5 mg/L	91.4	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.0 mg/L	12.5 mg/L	95.8	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.241 mg/L	0.25 mg/L	96.4	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.75 mg/L	10 mg/L	97.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.228 mg/L	0.25 mg/L	91.3	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	1.12 mg/L	1.25 mg/L	89.5	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	2.22 mg/L	2.5 mg/L	88.7	50.0	140	----
		iron, TCLP	7439-89-6	E444	228 mg/L	250 mg/L	91.2	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.7 mg/L	10 mg/L	107	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	238 mg/L	250 mg/L	95.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.20 mg/L	2.5 mg/L	87.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.59 mg/L	5 mg/L	91.8	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.104 mg/L	0.1 mg/L	104	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	5.12 mg/L	5 mg/L	102	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.69 mg/L	0.75 mg/L	92.4	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	8 mg/L	10 mg/L	80.3	50.0	150	----
TCLP Metals (QCLot: 262088)										
VA21B5919-001	BA2131-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	94.8	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: 261239)									
QC-261239-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	99.6	70.0	130	----
Metals (QCLot: 261240)									
QC-261240-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	86.7	70.0	130	----
QC-261240-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	92.9	70.0	130	----
QC-261240-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	99.5	70.0	130	----
QC-261240-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	92.7	70.0	130	----
QC-261240-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-261240-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	124	40.0	160	----
QC-261240-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	91.2	70.0	130	----
QC-261240-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
QC-261240-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	102	70.0	130	----
QC-261240-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	94.7	70.0	130	----
QC-261240-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	94.2	70.0	130	----
QC-261240-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	94.9	70.0	130	----
QC-261240-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	100	70.0	130	----
QC-261240-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
QC-261240-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	103	70.0	130	----
QC-261240-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
QC-261240-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	90.4	70.0	130	----
QC-261240-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	93.5	70.0	130	----
QC-261240-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	87.0	70.0	130	----
QC-261240-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	103	70.0	130	----
QC-261240-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	96.2	70.0	130	----
QC-261240-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	94.8	70.0	130	----
QC-261240-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	94.2	40.0	160	----
QC-261240-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
QC-261240-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	113	70.0	130	----
QC-261240-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	# 138	70.0	130	MES
QC-261240-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	99.3	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: 261240) - continued									
QC-261240-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	94.6	70.0	130	----
QC-261240-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	89.9	70.0	130	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



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 Skrypyk	<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
Phone:	604-521-1025	Email 2:	rjohnson4@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypyk@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT
			brent.kirkpatrick@metrovancover.org		Analysis Request
			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:		Quote #:			
Phone:					

Lab Work Order # (lab use only)		ALS Contact:	Sampler:					Number of Containers	
Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6		MET-CSR+FULL-VA (all metals)
5919									
1	BA2131-A-1	28-Jul-21	9:00	Soil	X	X		X	1
2	BA2131-A-2	28-Jul-21	9:00	Soil	X	X		X	1
3	BA2131-A-3	28-Jul-21	9:00	Soil	X	X		X	1
4	BA2131-A-4	28-Jul-21	9:00	Soil	X	X		X	1
5	BA2131-A-5	28-Jul-21	9:00	Soil	X	X		X	1
6	BA2131-A-6	28-Jul-21	9:00	Soil	X	X		X	1
7	BA2131-A-7	28-Jul-21	9:00	Soil	X	X		X	1
8	BA2131-A-8	28-Jul-21	9:00	Soil	X	X		X	1
9	BA2131-A-9	28-Jul-21	9:00	Soil	X	X		X	1
10	BA2131-A-10	28-Jul-21	9:00	Soil	X	X		X	1
11	BA2131-A-11	28-Jul-21	9:00	Soil	X	X		X	1
12	BA2131-A-12	28-Jul-21	9:00	Soil	X	X		X	1

Environmental Division
 Vancouver
 Work Order Reference
VA21B5919

Telephone : +1 604 263 4188

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
<i>[Signature]</i>	3-Aug-21	0800	<i>[Signature]</i>	Aug 3/21	11:20	23.0°C				