

Bottom Ash Data

2021 Week 50

The following analytical report represents bottom ash composite results for week 50 of 2021 (December 5, 2021 to December 11, 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 : **VA21C7787**
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 : 14-Dec-2021 13:30
Date Analysis Commenced : 17-Dec-2021
Issue Date : 23-Dec-2021 15:36

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>
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
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Qualifiers

<i>Qualifier</i>	<i>Description</i>
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2150-A-1	BA2150-A-2	BA2150-A-3	BA2150-A-4	BA2150-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-001	VA21C7787-002	VA21C7787-003	VA21C7787-004	VA21C7787-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	27.0	25.0	27.3	26.5	26.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.9	11.1	10.9	11.0	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	44800	30700	33800	34000	32600	
antimony	7440-36-0	E440	0.10	mg/kg	99.8	179	130	112	119	
arsenic	7440-38-2	E440	0.10	mg/kg	15.5	20.9	18.6	18.2	16.9	
barium	7440-39-3	E440	0.50	mg/kg	679	656	696	611	570	
beryllium	7440-41-7	E440	0.10	mg/kg	0.42	0.39	0.42	0.39	0.73	
bismuth	7440-69-9	E440	0.20	mg/kg	6.48	9.13	7.33	6.46	16.5	
boron	7440-42-8	E440	5.0	mg/kg	152	179	219	210	199	
cadmium	7440-43-9	E440	0.020	mg/kg	7.36	11.8	10.2	13.4	9.78	
calcium	7440-70-2	E440	50	mg/kg	125000	144000	146000	144000	133000	
chromium	7440-47-3	E440	0.50	mg/kg	151	179	155	162	167	
cobalt	7440-48-4	E440	0.10	mg/kg	66.5	40.5	34.0	30.1	49.6	
copper	7440-50-8	E440	0.50	mg/kg	2710	10600	1680	1500	2770	
iron	7439-89-6	E440	50	mg/kg	74800	62400	58000	43500	53200	
lead	7439-92-1	E440	0.50	mg/kg	418	432	8420	485	508	
lithium	7439-93-2	E440	2.0	mg/kg	70.1	27.2	21.3	20.1	25.0	
magnesium	7439-95-4	E440	20	mg/kg	13000	14900	13300	13500	13300	
manganese	7439-96-5	E440	1.0	mg/kg	971	981	958	655	787	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0686	0.0864	0.0761	0.256	0.0780	
molybdenum	7439-98-7	E440	0.10	mg/kg	44.0	52.3	50.2	55.3	47.2	
nickel	7440-02-0	E440	0.50	mg/kg	244	253	155	134	140	
phosphorus	7723-14-0	E440	50	mg/kg	10500	11300	11800	12500	11200	
potassium	7440-09-7	E440	100	mg/kg	5060	5450	5900	6060	5790	
selenium	7782-49-2	E440	0.20	mg/kg	0.27	0.29	0.38	0.30	0.30	
silver	7440-22-4	E440	0.10	mg/kg	9.61	8.01	6.52	5.72	8.30	
sodium	7440-23-5	E440	50	mg/kg	16600	16200	17000	18000	17500	
strontium	7440-24-6	E440	0.50	mg/kg	296	329	362	367	334	
sulfur	7704-34-9	E440	1000	mg/kg	10700	13100	13300	12000	13400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2150-A-1	BA2150-A-2	BA2150-A-3	BA2150-A-4	BA2150-A-5
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-001	VA21C7787-002	VA21C7787-003	VA21C7787-004	VA21C7787-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.055	0.067	0.064	0.143	0.059	
tin	7440-31-5	E440	2.0	mg/kg	95.2	105	113	106	104	
titanium	7440-32-6	E440	1.0	mg/kg	1500	659	724	404	632	
tungsten	7440-33-7	E440	0.50	mg/kg	16.3	19.4	23.0	20.7	25.5	
uranium	7440-61-1	E440	0.050	mg/kg	4.39	6.18	5.40	5.18	5.19	
vanadium	7440-62-2	E440	0.20	mg/kg	47.1	50.9	59.1	47.3	45.9	
zinc	7440-66-6	E440	2.0	mg/kg	2880	3650	3970	9270	3560	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	1.5	1.7	2.2	1.7	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.4	11.4	11.5	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.00	8.93	8.54	8.43	8.83	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	6.31	6.32	6.35	6.37	6.44	
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	2.07	2.10	2.11	2.33	2.03	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.110	0.120	0.190	0.131	0.534 ^{RRV}	
calcium, TCLP	7440-70-2	E444	10	mg/L	1870	1890	1940	1990	1900	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.870	0.894	0.739	0.823	0.942	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.802	0.938	0.849	1.24	0.624	
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	138	145	143	148	138	
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	0.34	0.59	0.40	0.58	0.43	
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	BA2150-A-1	BA2150-A-2	BA2150-A-3	BA2150-A-4	BA2150-A-5
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-001	VA21C7787-002	VA21C7787-003	VA21C7787-004	VA21C7787-005	
					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	20.5	23.4	23.3	29.3	27.8	
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 (Matrix: Soil/Solid)					Client sample ID	BA2150-A-6	BA2150-A-7	BA2150-A-8	BA2150-A-9	BA2150-A-10
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-006	VA21C7787-007	VA21C7787-008	VA21C7787-009	VA21C7787-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	25.9	25.7	25.2	26.7	25.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.9	11.0	10.9	10.8	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	42900	41300	41100	35900	54800	
antimony	7440-36-0	E440	0.10	mg/kg	119	128	158	114	115	
arsenic	7440-38-2	E440	0.10	mg/kg	16.5	18.5	20.7	16.3	16.4	
barium	7440-39-3	E440	0.50	mg/kg	519	651	733	621	784	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.39	0.49	0.39	0.40	
bismuth	7440-69-9	E440	0.20	mg/kg	7.01	8.23	10.0	6.70	6.61	
boron	7440-42-8	E440	5.0	mg/kg	182	231	323	244	237	
cadmium	7440-43-9	E440	0.020	mg/kg	17.2	9.07	10.6	9.93	9.84	
calcium	7440-70-2	E440	50	mg/kg	134000	127000	150000	131000	136000	
chromium	7440-47-3	E440	0.50	mg/kg	130	156	226	142	246	
cobalt	7440-48-4	E440	0.10	mg/kg	33.9	437	153	132	539	
copper	7440-50-8	E440	0.50	mg/kg	5960	4480	1720	6700	1640	
iron	7439-89-6	E440	50	mg/kg	45000	80900	43900	42800	75400	
lead	7439-92-1	E440	0.50	mg/kg	406	387	466	349	728	
lithium	7439-93-2	E440	2.0	mg/kg	20.0	61.3	65.7	23.5	40.9	
magnesium	7439-95-4	E440	20	mg/kg	11600	13100	19300	12500	13600	
manganese	7439-96-5	E440	1.0	mg/kg	933	863	1160	783	898	
mercury	7439-97-6	E510	0.0500	mg/kg	0.137	0.0693	0.0826	0.0655	0.103	
molybdenum	7439-98-7	E440	0.10	mg/kg	64.6	60.0	56.9	45.8	41.1	
nickel	7440-02-0	E440	0.50	mg/kg	121	107	153	124	107	
phosphorus	7723-14-0	E440	50	mg/kg	11300	10700	14200	11000	12500	
potassium	7440-09-7	E440	100	mg/kg	6010	6020	6800	5510	5430	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.26	0.38	0.29	0.35	
silver	7440-22-4	E440	0.10	mg/kg	8.08	7.78	6.56	8.86	7.14	
sodium	7440-23-5	E440	50	mg/kg	17800	17300	20800	17300	16900	
strontium	7440-24-6	E440	0.50	mg/kg	369	383	428	367	342	
sulfur	7704-34-9	E440	1000	mg/kg	12600	12600	14200	12600	12100	
thallium	7440-28-0	E440	0.050	mg/kg	0.058	0.063	0.063	0.064	0.054	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2150-A-6	BA2150-A-7	BA2150-A-8	BA2150-A-9	BA2150-A-10
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-006	VA21C7787-007	VA21C7787-008	VA21C7787-009	VA21C7787-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	91.8	146	109	108	105	
titanium	7440-32-6	E440	1.0	mg/kg	574	893	900	543	1520	
tungsten	7440-33-7	E440	0.50	mg/kg	14.7	18.5	18.6	18.2	22.3	
uranium	7440-61-1	E440	0.050	mg/kg	5.00	4.83	5.84	4.87	4.68	
vanadium	7440-62-2	E440	0.20	mg/kg	46.6	46.9	53.2	48.8	49.4	
zinc	7440-66-6	E440	2.0	mg/kg	3650	3460	4120	2780	3330	
zirconium	7440-67-7	E440	1.0	mg/kg	2.5	1.7	2.4	2.0	3.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	11.6	11.6	11.7	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.49	8.95	9.26	9.12	9.29	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	6.29	6.33	6.22	6.30	6.29	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	1.2	<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	2.26	2.03	2.10	2.33	2.14	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.129	0.152	0.344	0.175	0.156	
calcium, TCLP	7440-70-2	E444	10	mg/L	2060	1910	1910	2080	1910	
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	1.23	0.709	0.465	0.514	1.26	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.07	0.667	1.49	1.63	1.20	
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	148	141	138	147	142	
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	0.44	0.51	0.39	0.44	0.49	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2150-A-6	BA2150-A-7	BA2150-A-8	BA2150-A-9	BA2150-A-10
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00	08-Dec-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-006	VA21C7787-007	VA21C7787-008	VA21C7787-009	VA21C7787-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	41.0	21.7	31.1	23.7	49.7	
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	BA2150-A-11	BA2150-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	08-Dec-2021 09:00	08-Dec-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-011	VA21C7787-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	27.5	26.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	11.2	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	55900	62800	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	103	145	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	17.0	19.0	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	712	632	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.34	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	7.90	7.64	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	235	202	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	8.22	10.3	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	127000	130000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	159	251	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	34.2	552	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2110	2760	----	----	----	
iron	7439-89-6	E440	50	mg/kg	56400	40200	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	329	1080	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	21.0	30.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	13600	11800	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	836	1180	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0518	0.133	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	62.5	59.9	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	111	367	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11100	12800	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5730	5230	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.35	0.32	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	4.67	8.30	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	15900	15400	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	297	322	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	11800	12700	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.057	0.066	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2150-A-11	BA2150-A-12	----	----	----
Client sampling date / time					08-Dec-2021 09:00	08-Dec-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-011	VA21C7787-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	84.4	82.9	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	1920	1660	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	17.8	26.8	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.15	5.24	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	46.9	52.2	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	2560	2830	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	5.0	6.9	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.6	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.07	9.07	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.34	6.16	----	----	----	
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	2.54	2.46	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.118	0.137	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	1990	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.839	1.45	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.01	1.15	----	----	----	
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	137	145	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.39	0.41	----	----	----	
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	BA2150-A-11	BA2150-A-12	----	----	----
					Client sampling date / time	08-Dec-2021 09:00	08-Dec-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C7787-011	VA21C7787-012	-----	-----	-----	
					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	23.1	33.1	----	----	----	
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	: VA21C7787	Page	: 1 of 14
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 14-Dec-2021 13:30
PO	: VANCO 0000050390	Issue Date	: 23-Dec-2021 15:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-1	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-10	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-11	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-12	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-2	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-3	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-4	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-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 BA2150-A-5	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-6	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-7	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-8	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2150-A-9	E510	08-Dec-2021	21-Dec-2021	----	----		22-Dec-2021	28 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2150-A-1	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2150-A-10	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2150-A-11	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2150-A-12	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-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 ICMS											
LDPE bag BA2150-A-2	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-3	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-4	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-5	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-6	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-7	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-8	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2150-A-9	E440	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	180 days	13 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2150-A-1	E144	08-Dec-2021	----	----	----		20-Dec-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 BA2150-A-10	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-11	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-12	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-2	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-3	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-4	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-5	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-6	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-7	E144	08-Dec-2021	----	----	----		20-Dec-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 BA2150-A-8	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2150-A-9	E144	08-Dec-2021	----	----	----		20-Dec-2021	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-1	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-10	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-11	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-12	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-2	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-3	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2150-A-4	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2150-A-5	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2150-A-6	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2150-A-7	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2150-A-8	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2150-A-9	E108	08-Dec-2021	21-Dec-2021	----	----		21-Dec-2021	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2150-A-1	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2150-A-10	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2150-A-11	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2150-A-12	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-2	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-3	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-4	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-5	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-6	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-7	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-8	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2150-A-9	E512	17-Dec-2021	----	----	----		19-Dec-2021	----	11 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2150-A-1	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-10	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-11	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-12	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-2	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-3	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-4	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-5	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-6	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2150-A-7	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2150-A-8	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2150-A-9	E444	17-Dec-2021	----	----	----		19-Dec-2021	180 days	11 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-1	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-10	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-11	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-12	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-2	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-3	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-4	EPP444	08-Dec-2021	17-Dec-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) BA2150-A-5	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-6	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-7	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-8	EPP444	08-Dec-2021	17-Dec-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2150-A-9	EPP444	08-Dec-2021	17-Dec-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	373052	1	18	5.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	373053	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	373055	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	373054	1	18	5.5	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	373052	2	18	11.1	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	373053	2	18	11.1	10.0	✔
Moisture Content by Gravimetry	E144	373055	1	16	6.2	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	373054	1	18	5.5	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	372108	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	373052	1	18	5.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	372107	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	373053	1	18	5.5	5.0	✔
Moisture Content by Gravimetry	E144	373055	1	16	6.2	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	372108	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	372107	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 $20 \pm 5^\circ\text{C}$), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at $<60^\circ\text{C}$) 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 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at $<60^\circ\text{C}$) 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 : 14 of 14
Work Order : VA21C7787
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 : **VA21C7787**

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 : 14-Dec-2021 13:30
 Date Analysis Commenced : 17-Dec-2021
 Issue Date : 23-Dec-2021 15:37

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Laboratory Department
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
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

Page : 2 of 11
Work Order : VA21C7787
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: 373054)											
VA21C7770-027	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	5.60	5.56	0.7%	5%	----
Physical Tests (QC Lot: 373055)											
VA21C7770-027	Anonymous	moisture	----	E144	0.25	%	23.2	23.4	0.912%	20%	----
Metals (QC Lot: 373052)											
VA21C7770-027	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0923	0.0423	Diff <2x LOR	----
Metals (QC Lot: 373053)											
VA21C7770-027	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	11600	12200	5.38%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.33	0.38	0.04	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.17	5.96	14.2%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	45.2	46.0	1.76%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.25	0.30	0.05	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.143	0.161	12.0%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	4780	4820	0.904%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	39.4	39.4	0.0786%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	11.2	11.9	6.03%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	21.0	23.8	12.6%	30%	----
		iron	7439-89-6	E440	50	mg/kg	20000	22400	10.9%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	3.58	4.23	16.5%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	10.2	11.6	1.4	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	7700	8200	6.23%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	251	259	2.88%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.55	0.76	31.9%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	43.8	46.5	6.06%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	534	596	10.9%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	790	840	6.93%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.23	0.24	0.01	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	280	291	3.71%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	32.5	32.7	0.608%	40%	----

Page : 4 of 11
 Work Order : VA21C7787
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Metals (QC Lot: 373053) - continued											
VA21C7770-027	Anonymous	sulfur	7704-34-9	E440	1000	mg/kg	2700	4300	1600	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.061	0.077	0.015	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1020	1020	0.0261%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.504	0.599	17.1%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	49.5	53.5	7.80%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	48.9	53.5	9.12%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	7.6	9.4	20.7%	30%	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 373055)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 373052)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 373053)						
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: 373053) - 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: 372107)						
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: 372108)						
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: 373054)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 373055)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 373052)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	103	80.0	120	----
Metals (QCLot: 373053)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.6	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	97.5	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	96.4	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	93.1	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	92.1	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.0	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	97.6	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	88.5	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	98.0	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	95.6	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.3	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	93.6	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	95.7	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	92.9	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.8	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.1	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	97.8	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	101	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	96.4	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.6	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	87.0	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	97.6	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	104	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	96.1	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: 373053) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	99.4	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	97.5	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	98.8	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.1	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	93.6	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	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: 372107)										
VA21C7787-001	BA2150-A-1	antimony, TCLP	7440-36-0	E444	5.0 mg/L	5 mg/L	101	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	12.9 mg/L	12.5 mg/L	104	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.238 mg/L	0.25 mg/L	95.3	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.27 mg/L	10 mg/L	92.7	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.250 mg/L	0.25 mg/L	100	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.24 mg/L	1.25 mg/L	98.8	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	2.32 mg/L	2.5 mg/L	92.8	50.0	140	----
		iron, TCLP	7439-89-6	E444	246 mg/L	250 mg/L	98.5	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.85 mg/L	10 mg/L	98.5	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	245 mg/L	250 mg/L	98.1	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.44 mg/L	2.5 mg/L	97.6	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.06 mg/L	5 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.116 mg/L	0.1 mg/L	116	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.2	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.72 mg/L	5 mg/L	94.4	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.75 mg/L	0.75 mg/L	99.7	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	91.0	50.0	150	----
TCLP Metals (QCLot: 372108)										
VA21C7787-001	BA2150-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	103	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: 373052)									
QC-373052-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	106	70.0	130	----
Metals (QCLot: 373053)									
QC-373053-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	109	70.0	130	----
QC-373053-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	98.4	70.0	130	----
QC-373053-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-373053-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	100	70.0	130	----
QC-373053-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	103	70.0	130	----
QC-373053-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	106	40.0	160	----
QC-373053-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	107	70.0	130	----
QC-373053-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	99.2	70.0	130	----
QC-373053-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	112	70.0	130	----
QC-373053-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-373053-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	108	70.0	130	----
QC-373053-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-373053-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	100	70.0	130	----
QC-373053-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	102	70.0	130	----
QC-373053-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	106	70.0	130	----
QC-373053-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	110	70.0	130	----
QC-373053-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	101	70.0	130	----
QC-373053-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
QC-373053-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	101	70.0	130	----
QC-373053-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	113	70.0	130	----
QC-373053-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	112	70.0	130	----
QC-373053-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	109	70.0	130	----
QC-373053-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	101	40.0	160	----
QC-373053-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	99.9	70.0	130	----
QC-373053-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	114	70.0	130	----
QC-373053-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	110	70.0	130	----
QC-373053-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	108	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: 373053) - continued									
QC-373053-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-373053-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	96.5	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

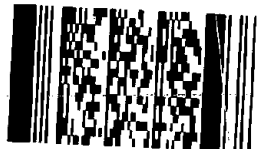
COC # _____

Page ____ of ____

Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)					
Contact: Steve Mckinney / Dan Skrypnyk			<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax			<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT					
Address: 5150 Riverbend Drive Burnaby BC			Email 1: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Phone: 604-521-1025			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			Email 3: dskrypnyk@covanta.com			Analysis Request					
			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 #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)																																																																																			
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)																																																																																															
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																																																																																															
Contact:			LSD: (includes 2:1 pH)																																																																																															
Address:			Quote #:																																																																																															
Phone:			Fax:																																																																																															

Lab Work Order # (lab use only)		7787		ALS Contact:		Sampler:	
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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													
BA2150-A-1	Environmental Division Vancouver Work Order Reference VA21C7787  Telephone: +1 604 253 4188	08-Dec-21	9:00	Soil	X	X		X													1	
BA2150-A-2		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-3		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-4		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-5		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-6		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-7		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-8		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-9		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-10		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-11		08-Dec-21	9:00	Soil	X	X		X														1
BA2150-A-12		08-Dec-21	9:00	Soil	X	X		X														1

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)			Observations:		
Released by:	Date (dd-mmm-yy):	Time (hh-mm):	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Yes / No ?	If Yes add SIF
	14 Dec 21	0800	SC	14 Dec 2021	13:30	20 ± 20°C					