

Bottom Ash Data

2021 Week 48

The following analytical report represents bottom ash composite results for week 48 of 2021 (November 21, 2021 to November 27, 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 : **VA21C6683**
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 : 30-Nov-2021 12:30
Date Analysis Commenced : 02-Dec-2021
Issue Date : 12-Dec-2021 15:33

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
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Woochan Song	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	BA2148-A-1	BA2148-A-2	BA2148-A-3	BA2148-A-4	BA2148-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-001	VA21C6683-002	VA21C6683-003	VA21C6683-004	VA21C6683-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	25.9	25.8	26.3	27.4	26.1	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	11.5	11.4	11.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	41300	38900	36800	47400	43500	
antimony	7440-36-0	E440	0.10	mg/kg	98.2	86.5	70.4	68.5	131	
arsenic	7440-38-2	E440	0.10	mg/kg	33.6	18.1	16.7	18.8	23.0	
barium	7440-39-3	E440	0.50	mg/kg	779	802	768	734	811	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.41	0.41	0.43	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	6.64	11.1	7.06	9.75	9.38	
boron	7440-42-8	E440	5.0	mg/kg	198	208	242	166	266	
cadmium	7440-43-9	E440	0.020	mg/kg	5.52	9.07	14.9	6.83	10.9	
calcium	7440-70-2	E440	50	mg/kg	129000	162000	135000	136000	156000	
chromium	7440-47-3	E440	0.50	mg/kg	150	162	143	252	135	
cobalt	7440-48-4	E440	0.10	mg/kg	36.8	48.3	100	166	258	
copper	7440-50-8	E440	0.50	mg/kg	6380	2080	2560	3970	1890	
iron	7439-89-6	E440	50	mg/kg	74900	71000	72300	66500	46600	
lead	7439-92-1	E440	0.50	mg/kg	544	744	835	529	887	
lithium	7439-93-2	E440	2.0	mg/kg	17.2	24.8	50.4	26.7	47.1	
magnesium	7439-95-4	E440	20	mg/kg	11400	13000	11900	11600	14800	
manganese	7439-96-5	E440	1.0	mg/kg	985	897	875	1570	941	
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	19.7	29.6	26.5	79.3	20.8	
nickel	7440-02-0	E440	0.50	mg/kg	174	146	137	294	301	
phosphorus	7723-14-0	E440	50	mg/kg	11000	15500	11000	12100	14100	
potassium	7440-09-7	E440	100	mg/kg	3520	4700	4160	4450	4920	
selenium	7782-49-2	E440	0.20	mg/kg	<0.20	0.30	0.21	<0.20	0.22	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	5.61	----	
silver	7440-22-4	E440	0.10	mg/kg	5.82	6.48	12.2	----	3.78	
sodium	7440-23-5	E440	50	mg/kg	12500	14400	13200	14200	16400	
strontium	7440-24-6	E440	0.50	mg/kg	276	349	298	293	366	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-1	BA2148-A-2	BA2148-A-3	BA2148-A-4	BA2148-A-5
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-001	VA21C6683-002	VA21C6683-003	VA21C6683-004	VA21C6683-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	7400	10900	8000	7800	9300	
thallium	7440-28-0	E440	0.050	mg/kg	0.061	0.073	0.061	0.054	0.064	
tin	7440-31-5	E440	2.0	mg/kg	103	119	128	3770	89.5	
titanium	7440-32-6	E440	1.0	mg/kg	481	559	927	835	589	
tungsten	7440-33-7	E440	0.50	mg/kg	12.6	15.8	14.7	14.1	10.2	
uranium	7440-61-1	E440	0.050	mg/kg	3.90	5.68	4.92	4.77	5.05	
vanadium	7440-62-2	E440	0.20	mg/kg	116	237	134	89.3	117	
zinc	7440-66-6	E440	2.0	mg/kg	3850	3900	2990	2920	3500	
zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.2	1.6	2.9	3.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.9	11.8	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.55	8.41	7.65	8.50	8.90	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.04	6.07	6.18	6.09	6.10	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.94	2.21	2.24	2.24	2.23	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.345	0.125	0.090	0.958	0.112	
calcium, TCLP	7440-70-2	E444	10	mg/L	1910	1990	1900	2070	1950	
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	0.833	0.992	0.666	0.565	0.767	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.806	1.41	0.971	1.10	1.11	
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	0.65	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	124	130	124	134	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	0.36	0.48	0.32	0.52	0.40	
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	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-1	BA2148-A-2	BA2148-A-3	BA2148-A-4	BA2148-A-5
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-001	VA21C6683-002	VA21C6683-003	VA21C6683-004	VA21C6683-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	0.36	0.23	0.19	<0.15	0.19	0.19
zinc, TCLP	7440-66-6	E444	0.50	mg/L	37.9	36.7	31.7	34.8	33.3	33.3
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-6	BA2148-A-7	BA2148-A-8	BA2148-A-9	BA2148-A-10
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-006	VA21C6683-007	VA21C6683-008	VA21C6683-009	VA21C6683-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	26.6	25.3	25.9	25.8	25.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.5	11.4	11.5	11.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	40800	41300	31200	50800	37400	
antimony	7440-36-0	E440	0.10	mg/kg	83.0	112	95.4	81.8	75.7	
arsenic	7440-38-2	E440	0.10	mg/kg	17.2	22.0	19.5	16.0	17.1	
barium	7440-39-3	E440	0.50	mg/kg	683	811	720	748	737	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.44	0.37	0.40	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	10.8	7.56	14.9	15.3	11.9	
boron	7440-42-8	E440	5.0	mg/kg	190	260	203	174	186	
cadmium	7440-43-9	E440	0.020	mg/kg	8.73	5.70	131	9.18	10.0	
calcium	7440-70-2	E440	50	mg/kg	157000	142000	158000	156000	151000	
chromium	7440-47-3	E440	0.50	mg/kg	144	117	154	128	121	
cobalt	7440-48-4	E440	0.10	mg/kg	84.6	33.3	45.0	44.0	157	
copper	7440-50-8	E440	0.50	mg/kg	2200	4540	5270	3100	2810	
iron	7439-89-6	E440	50	mg/kg	66600	55200	62200	43000	57400	
lead	7439-92-1	E440	0.50	mg/kg	721	7340	917	696	978	
lithium	7439-93-2	E440	2.0	mg/kg	24.1	21.7	21.8	22.4	22.6	
magnesium	7439-95-4	E440	20	mg/kg	13200	13800	13000	13500	12200	
manganese	7439-96-5	E440	1.0	mg/kg	1390	840	923	718	914	
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	25.4	20.6	27.6	25.2	22.5	
nickel	7440-02-0	E440	0.50	mg/kg	205	94.6	459	228	103	
phosphorus	7723-14-0	E440	50	mg/kg	14000	12300	14500	14300	13200	
potassium	7440-09-7	E440	100	mg/kg	4340	4410	4400	4480	4740	
selenium	7782-49-2	E440	0.20	mg/kg	0.24	<0.20	0.34	0.28	0.24	
silver	7440-22-4	E440	0.10	mg/kg	10.0	3.05	5.41	5.00	4.90	
sodium	7440-23-5	E440	50	mg/kg	13300	13200	13400	14900	14100	
strontium	7440-24-6	E440	0.50	mg/kg	365	326	331	306	346	
sulfur	7704-34-9	E440	1000	mg/kg	10600	6900	11500	10300	9000	
thallium	7440-28-0	E440	0.050	mg/kg	0.073	0.306	0.086	0.076	0.073	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-6	BA2148-A-7	BA2148-A-8	BA2148-A-9	BA2148-A-10
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-006	VA21C6683-007	VA21C6683-008	VA21C6683-009	VA21C6683-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	98.5	105	110	117	101	
titanium	7440-32-6	E440	1.0	mg/kg	449	774	330	546	377	
tungsten	7440-33-7	E440	0.50	mg/kg	17.2	9.11	15.0	17.4	11.2	
uranium	7440-61-1	E440	0.050	mg/kg	5.58	5.45	6.09	5.84	4.92	
vanadium	7440-62-2	E440	0.20	mg/kg	104	120	260	97.4	96.8	
zinc	7440-66-6	E440	2.0	mg/kg	4420	2630	5320	3710	2990	
zirconium	7440-67-7	E440	1.0	mg/kg	2.8	1.3	1.9	3.3	2.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.9	12.0	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.16	9.03	9.05	9.72	8.86	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.21	6.15	6.17	6.14	6.01	
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	2.18	2.10	2.34	2.25	2.06	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.116	0.106	0.136	0.145	0.112	
calcium, TCLP	7440-70-2	E444	10	mg/L	2040	1980	2120	1930	2020	
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	0.908	0.593	0.744	0.830	0.638	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.02	1.20	0.992	1.24	1.03	
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	0.32	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	135	134	139	126	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	0.40	0.37	0.41	0.33	0.41	
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	BA2148-A-6	BA2148-A-7	BA2148-A-8	BA2148-A-9	BA2148-A-10
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00	24-Nov-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-006	VA21C6683-007	VA21C6683-008	VA21C6683-009	VA21C6683-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	0.20	0.20	0.16	0.16	0.17	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	36.5	42.9	38.3	27.7	33.4	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-11	BA2148-A-12	----	----	----
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-011	VA21C6683-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	25.2	25.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39200	38000	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	106	68.2	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	18.8	18.8	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	894	746	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.48	0.36	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	7.64	7.36	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	193	215	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	6.99	5.46	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	152000	132000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	213	116	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	123	18.2	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1330	8280	----	----	----	
iron	7439-89-6	E440	50	mg/kg	67300	58500	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1590	725	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	22.1	17.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12900	11100	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	902	1030	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.0537	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	28.6	20.1	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	336	102	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	13600	12300	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4920	3850	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	<0.20	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	5.17	4.92	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	15000	14100	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	313	272	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	8400	6700	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.056	<0.050	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2148-A-11	BA2148-A-12	----	----	----
Client sampling date / time					24-Nov-2021 09:00	24-Nov-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-011	VA21C6683-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	471	79.0	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	590	455	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	18.8	12.6	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	4.61	4.13	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	92.8	94.6	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	4250	2670	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.8	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.16	8.84	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.11	6.10	---	---	---	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	---	---	---	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	---	---	---	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.15	2.11	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.103	0.096	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2040	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	0.949	0.739	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.16	1.16	---	---	---	
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	0.26	---	---	---	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	139	130	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.38	0.32	---	---	---	
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	BA2148-A-11	BA2148-A-12	----	----	----
					Client sampling date / time	24-Nov-2021 09:00	24-Nov-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C6683-011	VA21C6683-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	0.21	0.17	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	25.4	26.2	----	----	----	
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	: VA21C6683	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	: 30-Nov-2021 12:30
PO	: VANCO 0000050390	Issue Date	: 12-Dec-2021 15:33
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA21C6683-001	BA2148-A-1	arsenic	7440-38-2	E440	49.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6683-001	BA2148-A-1	cobalt	7440-48-4	E440	101 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6683-001	BA2148-A-1	copper	7440-50-8	E440	30.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6683-001	BA2148-A-1	molybdenum	7439-98-7	E440	70.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6683-001	BA2148-A-1	nickel	7440-02-0	E440	35.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6683-001	BA2148-A-1	titanium	7440-32-6	E440	47.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2148-A-4	E440.Ag	24-Nov-2021	10-Dec-2021	----	----		10-Dec-2021	----	16 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-1	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-10	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-11	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-12	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-2	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-3	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 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 BA2148-A-4	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-5	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-6	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-7	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-8	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2148-A-9	E510	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	28 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2148-A-1	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2148-A-10	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2148-A-11	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 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 BA2148-A-12	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-2	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-3	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-4	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-5	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-6	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-7	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-8	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2148-A-9	E440	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	180 days	15 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-1	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-10	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-11	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-12	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-2	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-3	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-4	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-5	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2148-A-6	E144	24-Nov-2021	----	----	----		07-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 BA2148-A-7	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2148-A-8	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2148-A-9	E144	24-Nov-2021	----	----	----		07-Dec-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-1	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-10	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-11	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-12	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-2	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-3	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 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 BA2148-A-4	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-5	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-6	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-7	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-8	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2148-A-9	E108	24-Nov-2021	09-Dec-2021	----	----		09-Dec-2021	30 days	15 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2148-A-1	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2148-A-10	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2148-A-11	E512	02-Dec-2021	----	----	----		05-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		
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-12	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-2	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-3	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-4	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-5	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-6	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-7	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-8	E512	02-Dec-2021	----	----	----		05-Dec-2021	----	11 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2148-A-9	E512	02-Dec-2021	----	----	----		05-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 : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-1	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-10	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-11	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-12	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-2	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-3	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-4	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-5	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2148-A-6	E444	02-Dec-2021	----	----	----		05-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) BA2148-A-7	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2148-A-8	E444	02-Dec-2021	----	----	----		05-Dec-2021	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2148-A-9	E444	02-Dec-2021	----	----	----		05-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) BA2148-A-1	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-10	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-11	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-12	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-2	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-3	EPP444	24-Nov-2021	02-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) BA2148-A-4	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-5	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-6	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-7	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-8	EPP444	24-Nov-2021	02-Dec-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2148-A-9	EPP444	24-Nov-2021	02-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	361980	1	19	5.2	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	361979	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	361982	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	361981	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	364496	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	361980	2	19	10.5	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	361979	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	361982	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	361981	1	19	5.2	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	364496	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	359805	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	361980	1	19	5.2	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	359806	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	361979	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	361982	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	359805	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	359806	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : VA21C6683

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 : 30-Nov-2021 12:30
Date Analysis Commenced : 02-Dec-2021
Issue Date : 12-Dec-2021 15:33

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 Caleb Deroche (Lab Analyst, Metals), Dan Gebert (Laboratory Analyst, Metals), Kevin Duarte (Supervisor - Metals ICP Instrumentation, Metals), Rebecca Sit (Supervisor - Organics Extractions, Organics), Robin Weeks (Team Leader - Metals, Metals), and Woonchan Song (Lab Analyst, Metals).

Page : 2 of 11
Work Order : VA21C6683
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: 361981)											
VA21C6683-001	BA2148-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	0.3%	5%	----
Physical Tests (QC Lot: 361982)											
VA21C6683-001	BA2148-A-1	moisture	----	E144	0.25	%	25.9	26.1	0.750%	20%	----
Metals (QC Lot: 361979)											
VA21C6683-001	BA2148-A-1	aluminum	7429-90-5	E440	50	mg/kg	41300	33300	21.5%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	98.2	80.7	19.6%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	33.6	20.2	49.7%	30%	DUP-H
		barium	7440-39-3	E440	0.50	mg/kg	779	776	0.383%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.39	0.03	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	6.64	8.86	28.6%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	198	211	6.33%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	5.52	7.29	27.5%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	129000	151000	15.7%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	150	203	29.8%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	36.8	112	101%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	6380	4690	30.5%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	74900	59600	22.7%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	544	634	15.3%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	17.2	20.5	17.7%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11400	14600	24.6%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	985	1010	2.39%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	19.7	41.4	70.9%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	174	250	35.9%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	11000	12800	15.4%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	3520	4050	13.9%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	<0.20	0.23	0.03	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.82	5.34	8.58%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	12500	13000	4.29%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	276	334	19.2%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	7400	9200	22.3%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.061	0.061	0.0002	Diff <2x LOR	----



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: 361979) - continued											
VA21C6683-001	BA2148-A-1	tin	7440-31-5	E440	2.0	mg/kg	103	89.6	14.3%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	481	296	47.6%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	12.6	9.72	25.6%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	3.90	4.94	23.5%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	116	146	23.0%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3850	4260	10.3%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.0	2.5	0.4	Diff <2x LOR	----
Metals (QC Lot: 361980)											
VA21C6683-001	BA2148-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	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: 361982)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 361979)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 361979) - continued						
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 361980)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 364496)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 359805)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 359806)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 361981)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 361982)									
moisture	---	E144	0.25	%	50 %	102	90.0	110	---
Metals (QCLot: 361979)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	113	80.0	120	---
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	---
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	112	80.0	120	---
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	---
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	106	80.0	120	---
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	---
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	112	80.0	120	---
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	---
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	106	80.0	120	---
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	109	80.0	120	---
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	---
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	---
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	106	80.0	120	---
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	105	80.0	120	---
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	106	80.0	120	---
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	119	80.0	120	---
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	111	80.0	120	---
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	---
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	111	80.0	120	---
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	120	80.0	120	---
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	113	80.0	120	---
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	---
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	89.4	80.0	120	---
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	110	80.0	120	---
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	112	80.0	120	---
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	108	80.0	120	---
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	104	80.0	120	---
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	107	80.0	120	---
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	111	80.0	120	---



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 361979) - continued									
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	105	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	112	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	114	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	102	80.0	120	----
Metals (QCLot: 361980)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	80.0	120	----
Metals (QCLot: 364496)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	90.7	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
TCLP Metals (QCLot: 359805)										
VA21C6683-001	BA2148-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	103	50.0	140	----
TCLP Metals (QCLot: 359806)										
VA21C6683-001	BA2148-A-1	antimony, TCLP	7440-36-0	E444	5.6 mg/L	5 mg/L	111	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	97.2	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.6 mg/L	12.5 mg/L	101	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.253 mg/L	0.25 mg/L	101	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.2 mg/L	10 mg/L	102	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.20 mg/L	1.25 mg/L	96.0	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	2.26 mg/L	2.5 mg/L	90.3	50.0	140	----
		iron, TCLP	7439-89-6	E444	233 mg/L	250 mg/L	93.4	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.6 mg/L	10 mg/L	106	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	235 mg/L	250 mg/L	93.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.27 mg/L	2.5 mg/L	90.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.94 mg/L	5 mg/L	98.9	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.114 mg/L	0.1 mg/L	114	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.1 mg/L	5 mg/L	102	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.14 mg/L	5 mg/L	103	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.73 mg/L	0.75 mg/L	97.2	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	94.2	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 361979)									
QC-361979-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
QC-361979-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	99.7	70.0	130	----
QC-361979-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	115	70.0	130	----
QC-361979-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	101	70.0	130	----
QC-361979-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-361979-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	113	40.0	160	----
QC-361979-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	102	70.0	130	----
QC-361979-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	106	70.0	130	----
QC-361979-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	108	70.0	130	----
QC-361979-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	103	70.0	130	----
QC-361979-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	103	70.0	130	----
QC-361979-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
QC-361979-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	96.8	70.0	130	----
QC-361979-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	98.3	70.0	130	----
QC-361979-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	114	70.0	130	----
QC-361979-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
QC-361979-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	102	70.0	130	----
QC-361979-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	105	70.0	130	----
QC-361979-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	106	70.0	130	----
QC-361979-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	112	70.0	130	----
QC-361979-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	102	70.0	130	----
QC-361979-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	103	70.0	130	----
QC-361979-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	91.1	40.0	160	----
QC-361979-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	93.8	70.0	130	----
QC-361979-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
QC-361979-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	102	70.0	130	----
QC-361979-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----
QC-361979-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-361979-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	97.6	70.0	130	----

Page : 11 of 11
 Work Order : VA21C6683
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 361980)									
QC-361980-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	103	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 Fax: _____		Email 2: rjohnson4@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	
<input type="checkbox"/> Yes <input type="checkbox"/> No		Email 3: dskrypnyk@covanta.com		Analysis Request	
		brent.kirkpatrick@metrovancover.org			
		Sarah.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>MET-TCLP-VA (all metals, Hg)</td> <td>MOISTURE</td> <td>Chrome 6</td> <td>MET-CSR-FULL-VA (all metals)</td> <td colspan="7"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td colspan="7"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td colspan="7"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td colspan="7"></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: _____		ALS Contact:		Sampler:																																																					

Lab Work Order # (lab use only)		6683		ALS Contact:		Sampler:											
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	
BA2148-A-1		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-2		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-3		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-4		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-5		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-6		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-7		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-8		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-9		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-10		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-11		24-Nov-21	9:00	Soil	X	X		X									1
BA2148-A-12		24-Nov-21	9:00	Soil	X	X		X									1

Environmental Division
Vancouver
Work Order Reference
VA21C6683

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): 30-Nov-21	Time (hh-mm): 0900	Received by:	Date:	Time:	Temperature: 20, 20°C	Verified by:	Date: Nov 30/21	Time: 1230pm	Observations: Yes / No ? If Yes add SIF