

Bottom Ash Data

2021 Week 23

The following analytical report represents bottom ash composite results for week 23 of 2021 (May 30, 2021 to June 5, 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 : **VA21B1373**
Contact : **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 : 08-Jun-2021 10:10
Date Analysis Commenced : 09-Jun-2021
Issue Date : 18-Jun-2021 18:54

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>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2123-A-1	BA2123-A-2	BA2123-A-3	BA2123-A-4	BA2123-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-001	VA21B1373-002	VA21B1373-003	VA21B1373-004	VA21B1373-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	16.0	18.7	17.5	17.6	17.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	11.1	11.4	11.3	11.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	28100	30400	27300	40100	42900	
antimony	7440-36-0	E440	0.10	mg/kg	101	127	107	122	129	
arsenic	7440-38-2	E440	0.10	mg/kg	31.0	36.4	29.3	33.5	36.8	
barium	7440-39-3	E440	0.50	mg/kg	546	420	481	382	520	
beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.37	0.38	0.38	0.34	
bismuth	7440-69-9	E440	0.20	mg/kg	9.24	12.6	12.9	11.1	157	
boron	7440-42-8	E440	5.0	mg/kg	173	170	188	168	179	
cadmium	7440-43-9	E440	0.020	mg/kg	12.6	21.5	13.7	15.4	28.6	
calcium	7440-70-2	E440	50	mg/kg	116000	124000	131000	121000	127000	
chromium	7440-47-3	E440	0.50	mg/kg	184	151	152	143	127	
cobalt	7440-48-4	E440	0.10	mg/kg	462	49.6	40.3	37.1	25.0	
copper	7440-50-8	E440	0.50	mg/kg	8460	2290	2800	14500	2470	
iron	7439-89-6	E440	50	mg/kg	72600	62500	74700	56400	56100	
lead	7439-92-1	E440	0.50	mg/kg	714	571	824	625	497	
lithium	7439-93-2	E440	2.0	mg/kg	31.3	20.4	20.5	21.8	19.1	
magnesium	7439-95-4	E440	20	mg/kg	10100	11000	10200	9940	11200	
manganese	7439-96-5	E440	1.0	mg/kg	3610	755	1090	806	950	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0.0802	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	25.6	18.8	17.8	24.6	19.9	
nickel	7440-02-0	E440	0.50	mg/kg	238	144	158	110	90.2	
phosphorus	7723-14-0	E440	50	mg/kg	8970	10600	9590	9340	9960	
potassium	7440-09-7	E440	100	mg/kg	5330	5480	5470	5440	4850	
selenium	7782-49-2	E440	0.20	mg/kg	0.87	0.60	0.32	0.43	0.91	
silver	7440-22-4	E440	0.10	mg/kg	5.25	8.82	8.26	16.2	24.8	
sodium	7440-23-5	E440	50	mg/kg	14700	14400	15300	14600	13600	
strontium	7440-24-6	E440	0.50	mg/kg	255	291	289	269	345	
sulfur	7704-34-9	E440	1000	mg/kg	14400	15500	14200	15000	14300	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2123-A-1	BA2123-A-2	BA2123-A-3	BA2123-A-4	BA2123-A-5
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-001	VA21B1373-002	VA21B1373-003	VA21B1373-004	VA21B1373-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.053	0.062	0.061	0.125	0.056	
tin	7440-31-5	E440	2.0	mg/kg	125	799	140	114	155	
titanium	7440-32-6	E440	1.0	mg/kg	485	340	402	499	983	
tungsten	7440-33-7	E440	0.50	mg/kg	18.2	23.6	18.7	29.8	16.1	
uranium	7440-61-1	E440	0.050	mg/kg	4.72	5.31	4.82	5.15	4.93	
vanadium	7440-62-2	E440	0.20	mg/kg	45.1	49.8	46.0	46.8	46.2	
zinc	7440-66-6	E440	2.0	mg/kg	5390	4500	5110	9810	7440	
zirconium	7440-67-7	E440	1.0	mg/kg	1.1	1.5	1.5	2.2	1.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.9	11.8	11.9	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	10.2	10.1	10.0	10.2	10.3	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	2.85	2.85	2.85	
pH, TCLP final	----	EPP444	0.010	pH units	6.57	6.46	6.30	6.44	6.21	
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	1.93	2.13	2.00	2.02	2.12	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.210	0.265	0.502	0.269	0.215	
calcium, TCLP	7440-70-2	E444	10	mg/L	1930	2050	2040	2000	2010	
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	1.51	0.532	0.480	0.850	0.852	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.768	0.857	0.873	0.734	0.965	
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	127	131	129	118	129	
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	0.47	0.58	0.62	0.46	0.58	
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	BA2123-A-1	BA2123-A-2	BA2123-A-3	BA2123-A-4	BA2123-A-5
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-001	VA21B1373-002	VA21B1373-003	VA21B1373-004	VA21B1373-005	
					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	29.8	29.8	47.4	31.0	47.0	47.0
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	BA2123-A-6	BA2123-A-7	BA2123-A-8	BA2123-A-9	BA2123-A-10
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-006	VA21B1373-007	VA21B1373-008	VA21B1373-009	VA21B1373-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	16.9	16.1	18.3	16.1	16.9	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.2	11.2	11.2	11.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	28500	28800	30700	25000	34900	
antimony	7440-36-0	E440	0.10	mg/kg	116	150	128	122	130	
arsenic	7440-38-2	E440	0.10	mg/kg	32.8	35.1	35.0	32.1	60.9	
barium	7440-39-3	E440	0.50	mg/kg	508	520	511	438	516	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.34	0.40	0.34	0.36	
bismuth	7440-69-9	E440	0.20	mg/kg	28.0	14.9	15.1	10.1	9.86	
boron	7440-42-8	E440	5.0	mg/kg	150	150	168	167	200	
cadmium	7440-43-9	E440	0.020	mg/kg	14.2	18.0	19.0	15.0	13.5	
calcium	7440-70-2	E440	50	mg/kg	128000	113000	136000	120000	116000	
chromium	7440-47-3	E440	0.50	mg/kg	193	183	222	141	172	
cobalt	7440-48-4	E440	0.10	mg/kg	90.9	70.0	42.5	26.3	64.9	
copper	7440-50-8	E440	0.50	mg/kg	5300	1650	3610	1760	5560	
iron	7439-89-6	E440	50	mg/kg	61800	75300	70800	59800	89400	
lead	7439-92-1	E440	0.50	mg/kg	532	1380	684	5480	489	
lithium	7439-93-2	E440	2.0	mg/kg	18.9	18.8	22.5	18.9	19.2	
magnesium	7439-95-4	E440	20	mg/kg	11200	9910	10700	9760	10100	
manganese	7439-96-5	E440	1.0	mg/kg	1020	833	760	751	981	
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	19.2	35.0	20.2	38.7	39.2	
nickel	7440-02-0	E440	0.50	mg/kg	115	121	143	111	915	
phosphorus	7723-14-0	E440	50	mg/kg	9010	9150	9840	10100	8300	
potassium	7440-09-7	E440	100	mg/kg	4520	4940	5380	5010	4600	
selenium	7782-49-2	E440	0.20	mg/kg	0.45	0.31	0.37	0.41	0.43	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	5.96	----	----	
silver	7440-22-4	E440	0.10	mg/kg	9.95	6.37	----	6.41	5.71	
sodium	7440-23-5	E440	50	mg/kg	13500	13900	14000	14000	13000	
strontium	7440-24-6	E440	0.50	mg/kg	279	293	287	292	288	
sulfur	7704-34-9	E440	1000	mg/kg	14200	13500	15800	15400	12400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2123-A-6	BA2123-A-7	BA2123-A-8	BA2123-A-9	BA2123-A-10
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-006	VA21B1373-007	VA21B1373-008	VA21B1373-009	VA21B1373-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.055	0.102	0.070	0.065	0.053	
tin	7440-31-5	E440	2.0	mg/kg	227	259	144	112	173	
titanium	7440-32-6	E440	1.0	mg/kg	514	487	371	319	566	
tungsten	7440-33-7	E440	0.50	mg/kg	13.1	23.7	39.8	33.6	12.8	
uranium	7440-61-1	E440	0.050	mg/kg	5.06	4.80	5.45	5.06	4.36	
vanadium	7440-62-2	E440	0.20	mg/kg	47.2	46.5	52.1	55.4	46.6	
zinc	7440-66-6	E440	2.0	mg/kg	5060	15100	5020	4680	4260	
zirconium	7440-67-7	E440	1.0	mg/kg	1.1	1.2	1.3	1.2	1.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	11.7	11.7	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	10.0	10.1	9.65	10.1	10.1	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	2.85	2.85	2.85	
pH, TCLP final	----	EPP444	0.010	pH units	6.25	6.47	6.32	6.27	6.55	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.24	2.08	2.09	2.06	1.99	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.446	0.199	0.239	0.228	0.199	
calcium, TCLP	7440-70-2	E444	10	mg/L	2150	2000	2080	2090	2010	
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	1.25	0.915	0.964	0.765	0.524	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.990	0.708	1.19	1.01	0.543	
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	136	124	133	129	126	
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	0.92	0.41	0.55	0.50	0.45	
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	BA2123-A-6	BA2123-A-7	BA2123-A-8	BA2123-A-9	BA2123-A-10
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00	02-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-006	VA21B1373-007	VA21B1373-008	VA21B1373-009	VA21B1373-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	43.4	26.2	53.1	34.5	24.6	24.6
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2123-A-11	BA2123-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	02-Jun-2021 09:00	02-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-011	VA21B1373-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	16.9	18.0	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.5	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	28900	34500	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	113	112	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	39.1	35.6	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	440	453	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.38	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	94.4	10.2	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	157	145	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	15.2	13.7	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	125000	119000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	146	143	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	28.7	25.2	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	4430	3720	----	----	----	
iron	7439-89-6	E440	50	mg/kg	64800	69900	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	404	492	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	53.0	35.0	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12300	10300	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	804	1760	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	29.9	31.7	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	137	966	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	9010	8170	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4970	4920	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.44	0.34	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	6.25	5.97	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	13800	13300	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	276	307	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	14900	13000	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.054	0.257	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2123-A-11	BA2123-A-12	----	----	----
Client sampling date / time					02-Jun-2021 09:00	02-Jun-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-011	VA21B1373-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	124	168	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	349	496	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	20.7	17.4	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	4.77	4.79	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	46.6	46.4	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	7220	29200	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.7	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	10.3	9.86	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.33	6.30	---	---	---	
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	2.10	2.04	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.313	0.221	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2110	2050	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.00	0.755	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.863	0.632	---	---	---	
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	134	133	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.62	0.50	---	---	---	
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	BA2123-A-11	BA2123-A-12	----	----	----
					Client sampling date / time	02-Jun-2021 09:00	02-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B1373-011	VA21B1373-012	-----	-----	-----	
					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	37.6	44.6	----	----	----	
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	: VA21B1373	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	: 08-Jun-2021 10:10
PO	: VANCO 0000050390	Issue Date	: 18-Jun-2021 18:54
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	VA21B1373-001	BA2123-A-1	cadmium	7440-43-9	E440	119 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1373-001	BA2123-A-1	cobalt	7440-48-4	E440	122 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1373-001	BA2123-A-1	copper	7440-50-8	E440	133 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1373-001	BA2123-A-1	lead	7439-92-1	E440	47.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1373-001	BA2123-A-1	manganese	7439-96-5	E440	82.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1373-001	BA2123-A-1	nickel	7440-02-0	E440	47.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2123-A-8	E440.Ag	02-Jun-2021	18-Jun-2021	----	17 days	✓	18-Jun-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-1	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-10	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-11	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-12	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-2	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2123-A-3	E510	02-Jun-2021	17-Jun-2021	----	15 days	✓	17-Jun-2021	28 days	1 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 BA2123-A-4	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2123-A-5	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2123-A-6	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2123-A-7	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2123-A-8	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2123-A-9	E510	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	28 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2123-A-1	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2123-A-10	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2123-A-11	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 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 BA2123-A-12	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-2	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-3	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-4	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-5	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-6	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-7	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-8	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2123-A-9	E440	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	180 days	1 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 BA2123-A-1	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-10	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-11	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-12	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-2	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-3	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-4	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-5	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2123-A-6	E144	02-Jun-2021	----	----	----		16-Jun-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 BA2123-A-7	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2123-A-8	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2123-A-9	E144	02-Jun-2021	----	----	----		16-Jun-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-1	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-10	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-11	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-12	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-2	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-3	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 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 BA2123-A-4	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-5	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-6	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-7	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-8	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2123-A-9	E108	02-Jun-2021	17-Jun-2021	----	15 days	✔	17-Jun-2021	30 days	1 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2123-A-1	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2123-A-10	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2123-A-11	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-12	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-2	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-3	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-4	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-5	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-6	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-7	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-8	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2123-A-9	E512	09-Jun-2021	----	----	----		10-Jun-2021	----	9 days	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-1	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-10	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-11	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-12	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-2	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-3	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-4	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-5	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-6	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-7	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-8	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2123-A-9	E444	09-Jun-2021	----	----	----		10-Jun-2021	180 days	9 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-1	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-10	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-11	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-12	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-2	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-3	EPP444	02-Jun-2021	09-Jun-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) BA2123-A-4	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-5	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-6	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-7	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-8	EPP444	02-Jun-2021	09-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2123-A-9	EPP444	02-Jun-2021	09-Jun-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	222442	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	222443	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	222445	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	222444	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	224671	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	222442	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	222443	2	15	13.3	10.0	✔
Moisture Content by Gravimetry	E144	222445	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	222444	1	15	6.6	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	224671	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	218025	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	222442	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	218024	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	222443	1	15	6.6	5.0	✔
Moisture Content by Gravimetry	E144	222445	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	218025	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	218024	1	12	8.3	5.0	✔



Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 °C) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
High Silver in Soil/Solid by CRC ICPMS	E440.Ag Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : VA21B1373

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 : 08-Jun-2021 10:10
Date Analysis Commenced : 09-Jun-2021
Issue Date : 18-Jun-2021 18:54

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 Dee Lee (Analyst), Kevin Duarte (Supervisor - Metals ICP Instrumentation), Kim Jensen (Department Manager - Metals), Ophelia Chiu (Department Manager - Organics), and Robin Weeks (Team Leader - Metals).

Page : 2 of 11
Work Order : VA21B1373
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: 222444)											
VA21B1373-001	BA2123-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.3	11.4	1.5%	5%	----
Physical Tests (QC Lot: 222445)											
VA21B1373-001	BA2123-A-1	moisture	----	E144	0.25	%	16.0	17.1	6.52%	20%	----
Metals (QC Lot: 222442)											
VA21B1373-001	BA2123-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 222443)											
VA21B1373-001	BA2123-A-1	aluminum	7429-90-5	E440	50	mg/kg	28100	28900	2.84%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	101	133	27.0%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	31.0	36.3	15.7%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	546	454	18.3%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.36	0.03	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	9.24	12.0	26.2%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	173	152	12.8%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	12.6	49.5	119%	30%	DUP-H
		calcium	7440-70-2	E440	50	mg/kg	116000	131000	12.8%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	184	157	15.6%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	462	112	122%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	8460	1700	133%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	72600	64600	11.6%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	714	1160	47.6%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	31.3	23.6	27.8%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	10100	10800	6.80%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	3610	1500	82.7%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	25.6	18.5	32.1%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	238	146	47.7%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	8970	10300	13.8%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5330	4960	7.10%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.87	0.53	0.34	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.25	7.85	39.6%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	14700	14000	5.37%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	255	296	14.8%	40%	----



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: 222443) - continued											
VA21B1373-001	BA2123-A-1	sulfur	7704-34-9	E440	1000	mg/kg	14400	15900	9.99%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.053	0.059	0.006	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	125	140	11.8%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	485	380	24.2%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	18.2	23.0	23.7%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	4.72	5.58	16.8%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	45.1	49.0	8.21%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	5390	4920	9.06%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.1	1.3	0.2	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 222445)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 222442)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 222443)						
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: 222443) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 224671)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 218024)						
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: 218025)						
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: 222444)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 222445)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 222442)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Metals (QCLot: 222443)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.3	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	97.3	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.4	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.4	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	90.7	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	98.0	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.3	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	97.6	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	97.6	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.8	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	99.1	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.5	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.9	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	103	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	99.1	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	96.1	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	97.1	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	99.5	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.5	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	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	95.1	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
					LCS	Low	High		
Metals (QCLot: 222443) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	97.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	95.3	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.3	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	96.8	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	99.7	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	96.4	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	99.8	80.0	120	----
Metals (QCLot: 224671)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	103	80.0	120	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 218024)										
VA21B1373-001	BA2123-A-1	antimony, TCLP	7440-36-0	E444	4.8 mg/L	5 mg/L	95.4	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.4 mg/L	5 mg/L	88.5	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.1 mg/L	12.5 mg/L	89.0	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.218 mg/L	0.25 mg/L	87.0	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.65 mg/L	10 mg/L	96.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.208 mg/L	0.25 mg/L	83.4	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	1.10 mg/L	1.25 mg/L	88.2	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	2.13 mg/L	2.5 mg/L	85.2	50.0	140	----
		iron, TCLP	7439-89-6	E444	209 mg/L	250 mg/L	83.5	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.41 mg/L	10 mg/L	94.1	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	222 mg/L	250 mg/L	89.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.16 mg/L	2.5 mg/L	86.3	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.73 mg/L	5 mg/L	94.6	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.104 mg/L	0.1 mg/L	104	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.4 mg/L	5 mg/L	88.0	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.21 mg/L	5 mg/L	84.3	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.67 mg/L	0.75 mg/L	89.6	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	89.5	50.0	150	----
TCLP Metals (QCLot: 218025)										
VA21B1373-001	BA2123-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	86.0	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: 222442)									
QC-222442-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	103	70.0	130	----
Metals (QCLot: 222443)									
QC-222443-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	108	70.0	130	----
QC-222443-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	109	70.0	130	----
QC-222443-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	112	70.0	130	----
QC-222443-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	106	70.0	130	----
QC-222443-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	115	70.0	130	----
QC-222443-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	123	40.0	160	----
QC-222443-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	106	70.0	130	----
QC-222443-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	105	70.0	130	----
QC-222443-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
QC-222443-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-222443-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
QC-222443-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-222443-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	114	70.0	130	----
QC-222443-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	107	70.0	130	----
QC-222443-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	109	70.0	130	----
QC-222443-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	112	70.0	130	----
QC-222443-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	118	70.0	130	----
QC-222443-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	109	70.0	130	----
QC-222443-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	108	70.0	130	----
QC-222443-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
QC-222443-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	109	70.0	130	----
QC-222443-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	112	70.0	130	----
QC-222443-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	104	40.0	160	----
QC-222443-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	104	70.0	130	----
QC-222443-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	121	70.0	130	----
QC-222443-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	118	70.0	130	----
QC-222443-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	113	70.0	130	----

Page : 11 of 11
 Work Order : VA21B1373
 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: 222443) - continued									
QC-222443-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	102	70.0	130	----
QC-222443-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	121	70.0	130	----



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Chain of Custody / Analytical Request Form

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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 Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive	Email 1:	smckinney@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
	Burnaby BC	Email 2:	rjohnson4@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Phone:	604-521-1025	Fax:	dskrypnyk@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT
	<input type="checkbox"/> Yes <input type="checkbox"/> No	brent.kirkpatrick@metrovancover.org		Analysis Request	
		Sarah.Wellman@metrovancover.org			

Invoice To		Client / Project Information		Please indicate below Filtered, Preserved or both (F, P, F/P)					
Same as Report?		Job #:							
Hardcopy of Invoice with Report? <input type="checkbox"/> Yes <input type="checkbox"/> No		PO / AFE: PO# 46693 Weekly Bottom Ash - Suite							
Company:		LSD: (includes 2:1 pH)							
Contact:		Quote #:							
Address:									
Phone:									
Fax:									
Lab Work Order #		ALS Contact:		Sampler:					
(lab use only)									

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
					X	X			X	X	
1	BA2123-A-1	02-Jun-21	9:00	Soil	X	X			X		1
2	BA2123-A-2	02-Jun-21	9:00	Soil	X	X			X		1
3	BA2123-A-3	02-Jun-21	9:00	Soil	X	X			X		1
4	BA2123-A-4	02-Jun-21	9:00	Soil	X	X			X		1
5	BA2123-A-5	02-Jun-21	9:00	Soil	X	X			X		1
6	BA2123-A-6	02-Jun-21	9:00	Soil	X	X			X		1
7	BA2123-A-7	02-Jun-21	9:00	Soil	X	X			X		1
8	BA2123-A-8	02-Jun-21	9:00	Soil	X	X			X		1
9	BA2123-A-9	02-Jun-21	9:00	Soil	X	X			X		1
10	BA2123-A-10	02-Jun-21	9:00	Soil	X	X			X		1
11	BA2123-A-11	02-Jun-21	9:00	Soil	X	X			X		1
12	BA2123-A-12	02-Jun-21	9:00	Soil	X	X			X		1

Environmental Division
Vancouver
Work Order Reference
VA21B1373



Telephone : + 1 604 253 4188

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

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)			Observations: Yes / No ? If Yes add SIF
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	
<i>[Signature]</i>	8-Jun-21	0900				20°C	<i>[Signature]</i>	June 8 1040	

av. of 2 buckets 201 am