

Bottom Ash Data

2021 Week 24

The following analytical report represents bottom ash composite results for week 24 of 2021 (June 6, 2021 to June 12, 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 : **VA21B1998**
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 : 15-Jun-2021 11:25
Date Analysis Commenced : 17-Jun-2021
Issue Date : 23-Jun-2021 14:44

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>
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



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLA	Detection Limit adjusted for required dilution.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2124-A-1	BA2124-A-2	BA2124-A-3	BA2124-A-4	BA2124-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-001	VA21B1998-002	VA21B1998-003	VA21B1998-004	VA21B1998-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	18.2	18.2	18.3	16.9	19.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.4	11.5	11.4	11.5	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	28200	26300	29300	36800	29400	
antimony	7440-36-0	E440	0.10	mg/kg	121	100	127	112	132	
arsenic	7440-38-2	E440	0.10	mg/kg	32.9	26.9	31.9	28.7	32.1	
barium	7440-39-3	E440	0.50	mg/kg	511	606	462	618	878	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.40	0.34	0.35	0.33	
bismuth	7440-69-9	E440	0.20	mg/kg	8.46	6.80	8.16	6.84	6.57	
boron	7440-42-8	E440	5.0	mg/kg	222	274	184	163	217	
cadmium	7440-43-9	E440	0.020	mg/kg	13.1	18.5	13.2	10.6	9.14	
calcium	7440-70-2	E440	50	mg/kg	138000	130000	128000	128000	120000	
chromium	7440-47-3	E440	0.50	mg/kg	174	139	160	174	144	
cobalt	7440-48-4	E440	0.10	mg/kg	39.7	24.2	62.6	83.5	27.7	
copper	7440-50-8	E440	0.50	mg/kg	1920	1850	7810	2060	50300	
iron	7439-89-6	E440	50	mg/kg	67600	65300	56900	76700	64700	
lead	7439-92-1	E440	0.50	mg/kg	501	329	598	384	352	
lithium	7439-93-2	E440	2.0	mg/kg	21.8	18.1	30.5	21.7	16.4	
magnesium	7439-95-4	E440	20	mg/kg	11800	10500	11300	11600	11100	
manganese	7439-96-5	E440	1.0	mg/kg	992	789	1270	879	792	
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	20.9	15.9	16.8	16.8	20.6	
nickel	7440-02-0	E440	0.50	mg/kg	136	101	245	199	1390	
phosphorus	7723-14-0	E440	50	mg/kg	11200	9410	10300	10000	9230	
potassium	7440-09-7	E440	100	mg/kg	5050	4860	4790	4840	4340	
selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.47	0.50	0.35	0.26	
silver	7440-22-4	E440	0.10	mg/kg	17.1	10.9	14.9	17.6	14.4	
sodium	7440-23-5	E440	50	mg/kg	14300	14900	14100	14100	13200	
strontium	7440-24-6	E440	0.50	mg/kg	339	521	301	324	285	
sulfur	7704-34-9	E440	1000	mg/kg	15200	12100	13600	13800	11500	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2124-A-1	BA2124-A-2	BA2124-A-3	BA2124-A-4	BA2124-A-5
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-001	VA21B1998-002	VA21B1998-003	VA21B1998-004	VA21B1998-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.060	<0.050	0.056	0.060	<0.500 ^{DLA}	
tin	7440-31-5	E440	2.0	mg/kg	114	100	158	138	144	
titanium	7440-32-6	E440	1.0	mg/kg	487	946	337	734	677	
tungsten	7440-33-7	E440	0.50	mg/kg	54.7	23.1	19.5	17.0	18.0	
uranium	7440-61-1	E440	0.050	mg/kg	5.51	4.67	5.16	4.87	4.31	
vanadium	7440-62-2	E440	0.20	mg/kg	50.8	45.8	46.7	52.7	46.8	
zinc	7440-66-6	E440	2.0	mg/kg	4810	3590	9380	6380	4000	
zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	1.0	1.6	1.4	<1.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.7	11.9	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.21	9.30	9.55	9.85	9.85	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	2.83	2.83	2.83	
pH, TCLP final	----	EPP444	0.010	pH units	5.96	6.15	6.32	6.27	6.11	
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	2.14	2.21	2.04	2.14	2.04	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.281	0.141	0.153	0.304	0.184	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	2000	1930	2060	1910	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.573	0.807	1.26	0.953	0.996	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.63	0.355	1.03	0.257	0.420	
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	130	125	130	131	131	
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	0.59	0.82	0.71	0.63	0.65	
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	BA2124-A-1	BA2124-A-2	BA2124-A-3	BA2124-A-4	BA2124-A-5
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-001	VA21B1998-002	VA21B1998-003	VA21B1998-004	VA21B1998-005	
					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	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	76.7	32.9	52.9	28.5	32.1	
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	BA2124-A-6	BA2124-A-7	BA2124-A-8	BA2124-A-9	BA2124-A-10
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-006	VA21B1998-007	VA21B1998-008	VA21B1998-009	VA21B1998-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	17.5	18.4	18.7	17.2	17.5	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.6	11.5	11.6	11.4	11.5	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	24700	25400	29600	28600	27300	
antimony	7440-36-0	E440	0.10	mg/kg	114	223	104	114	100	
arsenic	7440-38-2	E440	0.10	mg/kg	57.2	28.8	34.0	34.0	28.0	
barium	7440-39-3	E440	0.50	mg/kg	604	667	565	532	574	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.39	0.36	0.46	0.39	
bismuth	7440-69-9	E440	0.20	mg/kg	8.25	23.1	7.68	8.38	14.9	
boron	7440-42-8	E440	5.0	mg/kg	233	232	195	185	184	
cadmium	7440-43-9	E440	0.020	mg/kg	12.5	23.6	12.7	29.2	9.95	
calcium	7440-70-2	E440	50	mg/kg	132000	122000	131000	127000	122000	
chromium	7440-47-3	E440	0.50	mg/kg	166	220	439	150	166	
cobalt	7440-48-4	E440	0.10	mg/kg	247	29.5	158	548	28.7	
copper	7440-50-8	E440	0.50	mg/kg	6990	6220	2230	5220	1760	
iron	7439-89-6	E440	50	mg/kg	72800	72600	61500	63100	53900	
lead	7439-92-1	E440	0.50	mg/kg	1000	7540	429	411	508	
lithium	7439-93-2	E440	2.0	mg/kg	22.6	17.3	23.2	25.2	19.0	
magnesium	7439-95-4	E440	20	mg/kg	12000	10200	12000	10600	10200	
manganese	7439-96-5	E440	1.0	mg/kg	1210	795	828	817	668	
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	17.8	16.1	37.7	17.6	17.0	
nickel	7440-02-0	E440	0.50	mg/kg	179	452	358	197	220	
phosphorus	7723-14-0	E440	50	mg/kg	9520	9100	10600	11600	10300	
potassium	7440-09-7	E440	100	mg/kg	4810	4700	4550	4810	4910	
selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.33	0.32	0.42	0.30	
silver	7440-22-4	E440.Ag	0.10	mg/kg	11.3	10.0	----	10.5	14.4	
silver	7440-22-4	E440	0.10	mg/kg	----	----	14.4	----	----	
sodium	7440-23-5	E440	50	mg/kg	14600	14200	13800	13800	14300	
strontium	7440-24-6	E440	0.50	mg/kg	327	330	366	295	298	
sulfur	7704-34-9	E440	1000	mg/kg	13100	11000	12800	14000	12100	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2124-A-6	BA2124-A-7	BA2124-A-8	BA2124-A-9	BA2124-A-10
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-006	VA21B1998-007	VA21B1998-008	VA21B1998-009	VA21B1998-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.053	0.075	0.055	0.065	0.131	
tin	7440-31-5	E440	2.0	mg/kg	1260	2520	121	116	96.8	
titanium	7440-32-6	E440	1.0	mg/kg	380	359	381	404	561	
tungsten	7440-33-7	E440	0.50	mg/kg	27.1	17.4	20.0	106	17.2	
uranium	7440-61-1	E440	0.050	mg/kg	4.90	4.40	4.88	5.16	5.02	
vanadium	7440-62-2	E440	0.20	mg/kg	48.6	50.4	50.4	47.3	50.6	
zinc	7440-66-6	E440	2.0	mg/kg	5340	5290	4230	10200	10100	
zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	1.2	1.2	1.1	<1.0	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.8	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	10.2	10.1	9.75	9.92	10.6	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	2.83	2.83	2.83	
pH, TCLP final	----	EPP444	0.010	pH units	6.21	6.16	6.18	6.15	5.97	
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	2.06	2.13	2.32	2.20	2.01	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.206	0.154	0.161	0.163	0.194	
calcium, TCLP	7440-70-2	E444	10	mg/L	1940	1970	1970	2030	1930	
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	0.704	1.18	0.899	1.05	0.461	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.424	0.665	1.28	0.929	0.865	
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	121	128	126	130	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	0.78	0.82	0.86	0.56	0.56	
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	BA2124-A-6	BA2124-A-7	BA2124-A-8	BA2124-A-9	BA2124-A-10
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00	09-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-006	VA21B1998-007	VA21B1998-008	VA21B1998-009	VA21B1998-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	52.4	49.1	61.9	41.9	41.1	41.1
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	BA2124-A-11	BA2124-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	09-Jun-2021 09:00	09-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-011	VA21B1998-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	18.4	17.8	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.5	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	24400	25500	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	116	130	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	31.8	38.0	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	415	498	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.38	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	8.45	9.54	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	198	186	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	16.2	17.3	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	134000	131000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	168	449	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	36.5	668	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	2360	3800	----	----	----	
iron	7439-89-6	E440	50	mg/kg	54600	88300	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	516	1660	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	22.2	34.8	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11000	10800	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	713	1050	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	49.5	29.2	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	138	423	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10000	11000	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5210	5120	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.57	0.38	----	----	----	
silver	7440-22-4	E440.Ag	0.10	mg/kg	17.3	----	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	16.6	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14400	14200	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	348	349	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12700	15000	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2124-A-11	BA2124-A-12	----	----	----
Client sampling date / time					09-Jun-2021 09:00	09-Jun-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-011	VA21B1998-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.058	0.064	----	----	----	
tin	7440-31-5	E440	2.0	mg/kg	106	226	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	204	431	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	22.3	26.0	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.36	5.39	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	49.4	53.8	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	5240	4640	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	<1.0	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.8	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	10.0	9.89	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.83	2.83	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	5.96	5.92	----	----	----	
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	2.22	2.03	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.171	0.144	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	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	1.28	0.806	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.366	0.110	----	----	----	
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	125	125	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.64	1.01	----	----	----	
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	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2124-A-11	BA2124-A-12	----	----	----
					Client sampling date / time	09-Jun-2021 09:00	09-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B1998-011	VA21B1998-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	----	----	----	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	39.5	32.9	----	----	----	
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	: VA21B1998	Page	: 1 of 16
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	: 15-Jun-2021 11:25
PO	: VANCO 0000050390	Issue Date	: 23-Jun-2021 14:45
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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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
Method Blank (MB) Values								
Metals	QC-MRG2-2236820 01	----	copper	7440-50-8	E440	0.50 ^B mg/kg	0.5 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.

Duplicate (DUP) RPDs								
Metals	VA21B1998-001	BA2124-A-1	cobalt	7440-48-4	E440	53.8 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	copper	7440-50-8	E440	33.7 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	lead	7439-92-1	E440	79.9 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	lithium	7439-93-2	E440	72.6 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	silver	7440-22-4	E440	121 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	titanium	7440-32-6	E440	44.0 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B1998-001	BA2124-A-1	tungsten	7440-33-7	E440	87.3 % ^{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 BA2124-A-10	E440.Ag	09-Jun-2021	22-Jun-2021	----	14 days	✓	22-Jun-2021	----	1 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2124-A-11	E440.Ag	09-Jun-2021	22-Jun-2021	----	14 days	✓	22-Jun-2021	----	1 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2124-A-6	E440.Ag	09-Jun-2021	22-Jun-2021	----	14 days	✓	22-Jun-2021	----	1 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2124-A-7	E440.Ag	09-Jun-2021	22-Jun-2021	----	14 days	✓	22-Jun-2021	----	1 days	
Metals : High Silver in Soil/Solid by CRC ICPMS										
LDPE bag BA2124-A-9	E440.Ag	09-Jun-2021	22-Jun-2021	----	14 days	✓	22-Jun-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2124-A-1	E510	09-Jun-2021	18-Jun-2021	----	10 days	✓	21-Jun-2021	28 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2124-A-10	E510	09-Jun-2021	18-Jun-2021	----	10 days	✓	21-Jun-2021	28 days	4 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 BA2124-A-11	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-12	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-2	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-3	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-4	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-5	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-6	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-7	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2124-A-8	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 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 BA2124-A-9	E510	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	28 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-1	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-10	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-11	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-12	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-2	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-3	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-4	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2124-A-5	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 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 ICPMS											
LDPE bag BA2124-A-6	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2124-A-7	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2124-A-8	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2124-A-9	E440	09-Jun-2021	18-Jun-2021	----	10 days	✔	21-Jun-2021	180 days	4 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-1	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-10	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-11	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-12	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-2	E144	09-Jun-2021	----	----	----		17-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 BA2124-A-3	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-4	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-5	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-6	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-7	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-8	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2124-A-9	E144	09-Jun-2021	----	----	----		17-Jun-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-1	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-10	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-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 BA2124-A-11	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-12	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-2	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-3	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-4	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-5	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-6	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-7	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2124-A-8	E108	09-Jun-2021	18-Jun-2021	----	10 days	✔	18-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 BA2124-A-9	E108	09-Jun-2021	18-Jun-2021	----	10 days	✓	18-Jun-2021	30 days	1 days	✓	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-1	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-10	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-11	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-12	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-2	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-3	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-4	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2124-A-5	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2124-A-6	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2124-A-7	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2124-A-8	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2124-A-9	E512	19-Jun-2021	----	----	----		21-Jun-2021	----	13 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2124-A-1	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2124-A-10	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2124-A-11	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2124-A-12	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2124-A-2	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-3	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-4	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-5	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-6	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-7	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-8	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2124-A-9	E444	19-Jun-2021	----	----	----		21-Jun-2021	180 days	13 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-1	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-10	EPP444	09-Jun-2021	19-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) BA2124-A-11	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-12	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-2	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-3	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-4	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-5	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-6	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-7	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2124-A-8	EPP444	09-Jun-2021	19-Jun-2021	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group	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) BA2124-A-9	EPP444	09-Jun-2021	19-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	223682	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	223683	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	223685	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	223684	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	226975	1	5	20.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	223682	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	223683	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	223685	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	223684	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	226975	1	5	20.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	226213	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	223682	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	226214	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	223683	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	223685	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	226213	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	226214	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 : VA21B1998

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 : 15-Jun-2021 11:25
Date Analysis Commenced : 17-Jun-2021
Issue Date : 23-Jun-2021 14:44

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 Kevin Duarte (Supervisor - Metals ICP Instrumentation), Kim Jensen (Department Manager - Metals), and Ophelia Chiu (Department Manager - Organics).

Page : 2 of 11
Work Order : VA21B1998
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: 223684)											
VA21B1998-001	BA2124-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.4	11.2	1.2%	5%	----
Physical Tests (QC Lot: 223685)											
VA21B1998-001	BA2124-A-1	moisture	----	E144	0.25	%	18.2	20.0	9.61%	20%	----
Metals (QC Lot: 223682)											
VA21B1998-001	BA2124-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 223683)											
VA21B1998-001	BA2124-A-1	aluminum	7429-90-5	E440	50	mg/kg	28200	34700	20.6%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	121	107	12.2%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	32.9	33.2	0.690%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	511	566	10.1%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.34	0.05	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	8.46	6.70	23.3%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	222	278	22.1%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	13.1	10.0	26.9%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	138000	127000	8.66%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	174	145	18.1%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	39.7	69.0	53.8%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	1920	2700	33.7%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	67600	60600	10.9%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	501	1170	79.9%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	21.8	46.6	72.6%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	11800	10400	13.1%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	992	784	23.4%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	20.9	15.7	28.4%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	136	120	12.4%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	11200	10900	3.38%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5050	4770	5.66%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.39	0.29	0.10	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	17.1	69.5	121%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	14300	14500	1.40%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	339	306	10.2%	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: 223683) - continued											
VA21B1998-001	BA2124-A-1	sulfur	7704-34-9	E440	1000	mg/kg	15200	13400	12.5%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.060	0.054	0.005	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	114	113	0.0923%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	487	761	44.0%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	54.7	21.5	87.3%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	5.51	4.65	16.9%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	50.8	50.1	1.42%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4810	3990	18.6%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	1.3	0.3	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: 223685)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 223682)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 223683)						
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	B
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: 223683) - 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: 226975)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 226213)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 226214)						
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	----

Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.



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: 223684)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 223685)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 223682)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	91.2	80.0	120	----
Metals (QCLot: 223683)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	90.2	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	97.7	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.2	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	91.2	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	99.8	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	96.9	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	96.8	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	97.6	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	95.9	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.0	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	101	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	97.2	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	95.4	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	114	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	99.1	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	98.0	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	103	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				Qualifier
					Spike Concentration	Recovery (%)	Recovery Limits (%)		
					LCS	Low	High		
Metals (QCLot: 223683) - continued									
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	97.9	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	91.4	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	98.5	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	108	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	97.6	80.0	120	----
Metals (QCLot: 226975)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	104	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 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: 226213)										
VA21B1998-001	BA2124-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	91.9	50.0	140	----
TCLP Metals (QCLot: 226214)										
VA21B1998-001	BA2124-A-1	antimony, TCLP	7440-36-0	E444	4.9 mg/L	5 mg/L	98.4	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.6 mg/L	5 mg/L	93.0	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.6 mg/L	12.5 mg/L	109	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.220 mg/L	0.25 mg/L	88.2	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.23 mg/L	10 mg/L	92.3	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	1.15 mg/L	1.25 mg/L	92.1	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.22 mg/L	2.5 mg/L	89.0	50.0	140	----
		iron, TCLP	7439-89-6	E444	229 mg/L	250 mg/L	91.8	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.39 mg/L	10 mg/L	93.9	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	239 mg/L	250 mg/L	95.5	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.29 mg/L	2.5 mg/L	91.5	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.37 mg/L	5 mg/L	87.5	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.107 mg/L	0.1 mg/L	107	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	92.1	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.59 mg/L	5 mg/L	91.8	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.70 mg/L	0.75 mg/L	93.3	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	91.1	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: 223682)									
QC-223682-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	95.3	70.0	130	----
Metals (QCLot: 223683)									
QC-223683-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	84.4	70.0	130	----
QC-223683-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	96.6	70.0	130	----
QC-223683-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	98.8	70.0	130	----
QC-223683-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	95.4	70.0	130	----
QC-223683-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	105	70.0	130	----
QC-223683-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	105	40.0	160	----
QC-223683-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	106	70.0	130	----
QC-223683-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	99.1	70.0	130	----
QC-223683-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	96.9	70.0	130	----
QC-223683-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	92.8	70.0	130	----
QC-223683-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	96.8	70.0	130	----
QC-223683-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	92.9	70.0	130	----
QC-223683-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	98.7	70.0	130	----
QC-223683-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	98.4	70.0	130	----
QC-223683-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	94.2	70.0	130	----
QC-223683-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	93.9	70.0	130	----
QC-223683-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	105	70.0	130	----
QC-223683-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	91.8	70.0	130	----
QC-223683-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	104	70.0	130	----
QC-223683-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	97.8	70.0	130	----
QC-223683-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	94.2	70.0	130	----
QC-223683-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	106	70.0	130	----
QC-223683-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	93.8	40.0	160	----
QC-223683-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	96.7	70.0	130	----
QC-223683-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	103	70.0	130	----
QC-223683-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	93.0	70.0	130	----
QC-223683-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	94.2	70.0	130	----



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 223683) - continued									
QC-223683-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	98.5	70.0	130	----
QC-223683-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	94.4	70.0	130	----



Report To			Report Format / Distribution			Service Requested (Rush for routine analysis subject to availability)					
Company: Covanta Energy			<input type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)					
Contact: Steve McKinney / Dan Skrypyk			<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			Email 1: smckinney@covanta.com			<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT					
Burnaby BC			Email 2: rjohnson4@covanta.com			<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Phone: 604-521-1025			Email 3: dskrypyk@covanta.com			Analysis Request					
Fax: <input type="checkbox"/> Yes <input type="checkbox"/> No			brent.kirkpatrick@metrovancover.org								
			Sarah.Wellman@metrovancover.org								

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

Lab Work Order # (lab use only)		Sample Identification			Date	Time	Sample Type	MOISTURE			Chrome 6	MET-CSR+FULL-VA (all metals)			Number of Containers
Sample #	(This description will appear on the report)				(dd-mmm-yy)	(hh:mm)		MET-TCLP-VA (all metals, Hg)							
1	BA2124-A-1				09-Jun-21	9:00	Soil	X	X			X		1	
2	BA2124-A-2				09-Jun-21	9:00	Soil	X	X			X		1	
3	BA2124-A-3				09-Jun-21	9:00	Soil	X	X			X		1	
4	BA2124-A-4				09-Jun-21	9:00	Soil	X	X			X		1	
5	BA2124-A-5				09-Jun-21	9:00	Soil	X	X			X		1	
6	BA2124-A-6				09-Jun-21	9:00	Soil	X	X			X		1	
7	BA2124-A-7				09-Jun-21	9:00	Soil	X	X			X		1	
8	BA2124-A-8				09-Jun-21	9:00	Soil	X	X			X		1	
9	BA2124-A-9				09-Jun-21	9:00	Soil	X	X			X		1	
10	BA2124-A-10				09-Jun-21	9:00	Soil	X	X			X		1	
11	BA2124-A-11				09-Jun-21	9:00	Soil	X	X			X		1	
12	BA2124-A-12				09-Jun-21	9:00	Soil	X	X			X		1	

Environmental Division
 Vancouver
 Work Order Reference
VA21B1998

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)			
Released by:	Date (dd-mmm-yy): 15-Jun-21	Time (hh-mm): 8:00	Received by: AI	Date: JUN 15 2021	Time: 11:25am	Temperature: 20.320°C	Verified by:	Date:	Time:	Observations: Yes / No ?
										If Yes add SIF