

Bottom Ash Data

2021 Week 30

The following analytical report represents bottom ash composite results for week 30 of 2021 (July 18, 2021 to July 24, 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 : **VA21B5400**
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 : 27-Jul-2021 11:00
Date Analysis Commenced : 28-Jul-2021
Issue Date : 05-Aug-2021 09:28

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



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	BA2130-A-1	BA2130-A-2	BA2130-A-3	BA2130-A-4	BA2130-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-001	VA21B5400-002	VA21B5400-003	VA21B5400-004	VA21B5400-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.6	20.9	19.0	19.7	19.7	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	11.1	11.0	11.0	10.9	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	39300	34900	42600	27400	37500	
antimony	7440-36-0	E440	0.10	mg/kg	124	105	129	115	115	
arsenic	7440-38-2	E440	0.10	mg/kg	39.7	32.6	43.8	34.2	38.6	
barium	7440-39-3	E440	0.50	mg/kg	736	775	625	569	696	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.45	0.33	<0.50 ^{DLA}	0.42	
bismuth	7440-69-9	E440	0.20	mg/kg	8.86	6.12	6.10	7.39	6.67	
boron	7440-42-8	E440	5.0	mg/kg	190	263	382	217	183	
cadmium	7440-43-9	E440	0.020	mg/kg	9.98	8.40	10.0	7.98	10.3	
calcium	7440-70-2	E440	50	mg/kg	143000	135000	130000	117000	139000	
chromium	7440-47-3	E440	0.50	mg/kg	183	161	133	154	154	
cobalt	7440-48-4	E440	0.10	mg/kg	38.3	41.1	27.7	52.8	51.7	
copper	7440-50-8	E440	0.50	mg/kg	2060	3140	6420	28900	1300	
iron	7439-89-6	E440	50	mg/kg	69400	64500	59800	78600	71400	
lead	7439-92-1	E440	0.50	mg/kg	462	754	1840	1600	504	
lithium	7439-93-2	E440	2.0	mg/kg	18.2	19.8	28.4	16.8	22.0	
magnesium	7439-95-4	E440	20	mg/kg	13700	13200	13200	10400	13400	
manganese	7439-96-5	E440	1.0	mg/kg	7090	734	742	864	1220	
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	22.6	15.1	15.7	15.6	17.3	
nickel	7440-02-0	E440	0.50	mg/kg	144	100	131	182	96.6	
phosphorus	7723-14-0	E440	50	mg/kg	13500	11900	11000	10500	12700	
potassium	7440-09-7	E440	100	mg/kg	5720	5420	5180	4720	6190	
selenium	7782-49-2	E440	0.20	mg/kg	0.63	0.29	0.30	<1.00 ^{DLA}	0.31	
silver	7440-22-4	E440	0.10	mg/kg	8.76	5.63	7.48	10.6	6.63	
sodium	7440-23-5	E440	50	mg/kg	15800	15000	15200	13400	17600	
strontium	7440-24-6	E440	0.50	mg/kg	320	346	308	328	340	
sulfur	7704-34-9	E440	1000	mg/kg	12700	11900	12300	11600	12600	
thallium	7440-28-0	E440	0.050	mg/kg	0.051	<0.050	<0.050	<0.250 ^{DLA}	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2130-A-1	BA2130-A-2	BA2130-A-3	BA2130-A-4	BA2130-A-5
Client sampling date / time					21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-001	VA21B5400-002	VA21B5400-003	VA21B5400-004	VA21B5400-005	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	105	119	100	348	113	
titanium	7440-32-6	E440	1.0	mg/kg	892	956	814	696	548	
tungsten	7440-33-7	E440	0.50	mg/kg	16.7	11.2	9.10	12.7	16.0	
uranium	7440-61-1	E440	0.050	mg/kg	3.19	2.97	2.75	2.97	3.45	
vanadium	7440-62-2	E440	0.20	mg/kg	42.7	40.5	37.6	34.9	39.1	
zinc	7440-66-6	E440	2.0	mg/kg	4070	3640	3340	3720	8110	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.8	2.2	<5.0 ^{DLA}	1.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.7	11.8	11.8	11.7	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.55	8.31	8.17	8.27	9.24	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.22	6.40	6.28	6.02	6.01	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.67	2.29	2.27	2.28	2.09	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.139	0.144	0.517	0.137	0.138	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	2050	2030	1980	2020	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.69	0.850	0.630	0.687	1.40	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.991	1.01	0.800	0.736	0.232	
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	0.43	<0.25	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	133	137	129	131	137	
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	0.49	0.45	0.53	0.66	0.57	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2130-A-1	BA2130-A-2	BA2130-A-3	BA2130-A-4	BA2130-A-5
Client sampling date / time					21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-001	VA21B5400-002	VA21B5400-003	VA21B5400-004	VA21B5400-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
zinc, TCLP	7440-66-6	E444	0.50	mg/L	30.8	31.8	29.0	55.8	50.6	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2130-A-6	BA2130-A-7	BA2130-A-8	BA2130-A-9	BA2130-A-10
(Matrix: Soil/Solid)					Client sampling date / time	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-006	VA21B5400-007	VA21B5400-008	VA21B5400-009	VA21B5400-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.2	20.2	20.5	19.3	20.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	10.9	10.9	11.1	11.1	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	30400	39800	31600	38400	38200	
antimony	7440-36-0	E440	0.10	mg/kg	142	114	118	112	117	
arsenic	7440-38-2	E440	0.10	mg/kg	37.4	33.4	37.4	32.6	36.2	
barium	7440-39-3	E440	0.50	mg/kg	667	663	662	609	659	
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.36	0.39	0.33	0.39	
bismuth	7440-69-9	E440	0.20	mg/kg	11.1	6.87	7.32	8.33	7.53	
boron	7440-42-8	E440	5.0	mg/kg	227	180	224	217	160	
cadmium	7440-43-9	E440	0.020	mg/kg	11.3	9.61	11.0	8.49	12.9	
calcium	7440-70-2	E440	50	mg/kg	138000	140000	139000	122000	135000	
chromium	7440-47-3	E440	0.50	mg/kg	188	146	207	311	141	
cobalt	7440-48-4	E440	0.10	mg/kg	105	248	85.6	163	73.2	
copper	7440-50-8	E440	0.50	mg/kg	1910	2070	1730	2070	2420	
iron	7439-89-6	E440	50	mg/kg	73000	59700	64900	69800	68400	
lead	7439-92-1	E440	0.50	mg/kg	398	296	334	575	897	
lithium	7439-93-2	E440	2.0	mg/kg	22.6	21.8	28.1	24.0	17.3	
magnesium	7439-95-4	E440	20	mg/kg	13000	12800	13500	11400	12800	
manganese	7439-96-5	E440	1.0	mg/kg	878	771	835	710	725	
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	20.7	17.6	36.3	37.3	19.2	
nickel	7440-02-0	E440	0.50	mg/kg	153	114	1780	2670	176	
phosphorus	7723-14-0	E440	50	mg/kg	12800	12700	12000	12100	14100	
potassium	7440-09-7	E440	100	mg/kg	5820	5630	5450	5400	5410	
selenium	7782-49-2	E440	0.20	mg/kg	0.37	0.36	0.41	0.35	0.38	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	8.89	----	
silver	7440-22-4	E440	0.10	mg/kg	8.19	7.14	14.0	----	7.76	
sodium	7440-23-5	E440	50	mg/kg	14500	15900	14600	14300	15100	
strontium	7440-24-6	E440	0.50	mg/kg	337	350	371	294	340	
sulfur	7704-34-9	E440	1000	mg/kg	14200	13100	12500	12100	13500	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2130-A-6	BA2130-A-7	BA2130-A-8	BA2130-A-9	BA2130-A-10
(Matrix: Soil/Solid)					Client sampling date / time	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-006	VA21B5400-007	VA21B5400-008	VA21B5400-009	VA21B5400-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	154	137	105	195	180	
titanium	7440-32-6	E440	1.0	mg/kg	593	772	563	570	774	
tungsten	7440-33-7	E440	0.50	mg/kg	14.0	13.3	25.1	14.6	15.5	
uranium	7440-61-1	E440	0.050	mg/kg	3.37	3.12	3.14	2.84	3.25	
vanadium	7440-62-2	E440	0.20	mg/kg	39.3	41.8	55.3	37.6	42.1	
zinc	7440-66-6	E440	2.0	mg/kg	5440	6770	3470	6070	4440	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	2.0	1.3	2.0	1.8	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.8	11.8	11.8	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.55	8.90	8.09	8.78	9.45	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	5.94	6.18	6.59	6.11	5.91	
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	2.37	2.10	2.46	2.14	2.34	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.124	0.304	0.166	0.366	0.221	
calcium, TCLP	7440-70-2	E444	10	mg/L	1980	2010	2120	2040	2160	
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	0.682	1.16	1.14	1.08	0.903	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.605	1.07	0.749	0.527	1.31	
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	139	136	132	141	
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	0.46	0.49	0.61	0.57	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2130-A-6	BA2130-A-7	BA2130-A-8	BA2130-A-9	BA2130-A-10
Client sampling date / time					21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00	21-Jul-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-006	VA21B5400-007	VA21B5400-008	VA21B5400-009	VA21B5400-010	
TCLP Metals					Result	Result	Result	Result	Result	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	59.2	64.1	27.1	31.0	47.0	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2130-A-11	BA2130-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	21-Jul-2021 09:00	21-Jul-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-011	VA21B5400-012	-----	-----	-----	
					Result	Result	----	----	----	
Physical Tests										
moisture	----	E144	0.25	%	20.8	20.7	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.0	11.0	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	36600	29600	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	105	124	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	28.6	35.6	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	552	623	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.37	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	6.82	7.07	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	148	199	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	8.48	10.1	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	134000	137000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	206	273	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	69.3	546	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	1590	2920	----	----	----	
iron	7439-89-6	E440	50	mg/kg	66400	63000	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	291	377	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	18.1	30.3	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12700	12600	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	720	964	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	16.7	19.7	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	177	180	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11200	12100	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5620	5410	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.34	0.33	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	11.1	6.84	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14900	15100	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	302	338	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	11700	12500	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	----	----	----	
tin	7440-31-5	E440	2.0	mg/kg	110	122	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2130-A-11	BA2130-A-12	----	----	----
Client sampling date / time					21-Jul-2021 09:00	21-Jul-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-011	VA21B5400-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
titanium	7440-32-6	E440	1.0	mg/kg	494	632	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	10.4	14.5	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	3.46	3.25	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	35.6	39.2	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	3150	3420	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	2.3	1.4	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.8	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.92	8.87	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.16	6.21	---	---	---	
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	2.19	2.28	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.406	0.258	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	2060	---	---	---	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	---	---	---	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.02	0.895	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.05	1.38	---	---	---	
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	0.35	---	---	---	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	136	137	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.47	0.57	---	---	---	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	---	---	---	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	---	---	---	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	---	---	---	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	---	---	---	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	26.2	32.7	---	---	---	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2130-A-11	BA2130-A-12	----	----	----
					Client sampling date / time	21-Jul-2021 09:00	21-Jul-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B5400-011	VA21B5400-012	-----	-----	-----	
					Result	Result	----	----	----	
TCLP Metals										
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	: VA21B5400	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	: 27-Jul-2021 11:00
PO	: VANCO 0000050390	Issue Date	: 05-Aug-2021 09:28
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- 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	VA21B5400-001	BA2130-A-1	chromium	7440-47-3	E440	38.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5400-001	BA2130-A-1	copper	7440-50-8	E440	103 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B5400-001	BA2130-A-1	manganese	7439-96-5	E440	159 % 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 BA2130-A-9	E440.Ag	21-Jul-2021	04-Aug-2021	----	----		04-Aug-2021	----	14 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-1	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-10	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-11	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-12	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-2	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-3	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-4	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-5	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-6	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-7	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-8	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2130-A-9	E510	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	28 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2130-A-1	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2130-A-10	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2130-A-11	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-12	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-2	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-3	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-4	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-5	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-6	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-7	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-8	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2130-A-9	E440	21-Jul-2021	29-Jul-2021	----	----		03-Aug-2021	180 days	13 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-1	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-10	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-11	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-12	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-2	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-3	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-4	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-5	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2130-A-6	E144	21-Jul-2021	----	----	----		28-Jul-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 BA2130-A-7	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2130-A-8	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2130-A-9	E144	21-Jul-2021	----	----	----		28-Jul-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-1	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-10	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-11	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-12	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-2	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-3	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 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		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-4	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-5	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-6	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-7	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-8	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2130-A-9	E108	21-Jul-2021	29-Jul-2021	----	----		30-Jul-2021	30 days	9 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2130-A-1	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2130-A-10	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2130-A-11	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-12	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-2	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-3	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-4	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-5	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-6	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-7	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-8	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2130-A-9	E512	30-Jul-2021	----	----	----		02-Aug-2021	----	12 days	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-1	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-10	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-11	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-12	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-2	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-3	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-4	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-5	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2130-A-6	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2130-A-7	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2130-A-8	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2130-A-9	E444	30-Jul-2021	----	----	----		01-Aug-2021	180 days	11 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-1	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-10	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-11	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-12	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-2	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-3	EPP444	21-Jul-2021	30-Jul-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) BA2130-A-4	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-5	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-6	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-7	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-8	EPP444	21-Jul-2021	30-Jul-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2130-A-9	EPP444	21-Jul-2021	30-Jul-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	253786	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	253787	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	253789	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	253788	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	258092	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	253786	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	253787	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	253789	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	253788	1	12	8.3	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	258092	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	256450	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	253786	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	256451	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	253787	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	253789	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	256450	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	256451	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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



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



QUALITY CONTROL REPORT

Work Order : VA21B5400

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 : 27-Jul-2021 11:00
Date Analysis Commenced : 28-Jul-2021
Issue Date : 05-Aug-2021 09:28

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Dee Lee (Analyst), Kevin Duarte (Supervisor - Metals ICP Instrumentation), Rebecca Sit (Supervisor - Organics Extractions), and Robin Weeks (Team Leader - Metals).

Page : 2 of 11
Work Order : VA21B5400
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: 253788)											
VA21B5400-001	BA2130-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	10.8	0.4%	5%	----
Physical Tests (QC Lot: 253789)											
VA21B5400-001	BA2130-A-1	moisture	----	E144	0.25	%	19.6	20.0	2.11%	20%	----
Metals (QC Lot: 253786)											
VA21B5400-001	BA2130-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 253787)											
VA21B5400-001	BA2130-A-1	aluminum	7429-90-5	E440	50	mg/kg	39300	40700	3.48%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	124	129	4.27%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	39.7	39.7	0.111%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	736	671	9.16%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.40	0.05	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	8.86	7.36	18.5%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	190	244	25.1%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	9.98	9.86	1.15%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	143000	138000	3.47%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	183	271	38.9%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	38.3	37.6	1.88%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	2060	6420	103%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	69400	56900	19.7%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	462	403	13.6%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	18.2	20.3	11.0%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	13700	14200	3.40%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	7090	814	159%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	22.6	22.0	2.57%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	144	138	4.65%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	13500	14200	4.53%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5720	6330	10.1%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.63	0.32	0.31	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	8.76	9.19	4.77%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	15800	17400	10.0%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	320	371	15.0%	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: 253787) - continued											
VA21B5400-001	BA2130-A-1	sulfur	7704-34-9	E440	1000	mg/kg	12700	13300	4.65%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.051	<0.050	0.0007	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	105	102	2.22%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	892	681	26.9%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	16.7	15.4	7.81%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	3.19	3.23	1.37%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	42.7	44.1	3.33%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4070	3540	13.9%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.6	2.5	0.9	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: 253789)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 253786)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 253787)						
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: 253787) - 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: 258092)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 256450)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 256451)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 253788)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 253789)									
moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Metals (QCLot: 253786)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	96.6	80.0	120	----
Metals (QCLot: 253787)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	103	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	102	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	97.2	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	105	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	104	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	108	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	108	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	101	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	97.5	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	105	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	103	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	113	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 253787) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	106	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	100	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	105	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	107	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Metals (QCLot: 258092)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	97.3	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: 256450)										
VA21B5400-001	BA2130-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	89.5	50.0	140	----
TCLP Metals (QCLot: 256451)										
VA21B5400-001	BA2130-A-1	antimony, TCLP	7440-36-0	E444	5.0 mg/L	5 mg/L	101	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	99.1	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.8 mg/L	12.5 mg/L	110	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.245 mg/L	0.25 mg/L	98.1	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.75 mg/L	10 mg/L	97.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.240 mg/L	0.25 mg/L	95.9	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.20 mg/L	1.25 mg/L	96.4	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	2.30 mg/L	2.5 mg/L	92.1	50.0	140	----
		iron, TCLP	7439-89-6	E444	237 mg/L	250 mg/L	94.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.71 mg/L	10 mg/L	97.1	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	264 mg/L	250 mg/L	106	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.36 mg/L	2.5 mg/L	94.5	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.84 mg/L	5 mg/L	96.8	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.113 mg/L	0.1 mg/L	113	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.5 mg/L	5 mg/L	90.6	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.52 mg/L	5 mg/L	90.4	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.73 mg/L	0.75 mg/L	96.9	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	8 mg/L	10 mg/L	84.4	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: 253786)									
QC-253786-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	98.9	70.0	130	----
Metals (QCLot: 253787)									
QC-253787-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	110	70.0	130	----
QC-253787-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	106	70.0	130	----
QC-253787-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	120	70.0	130	----
QC-253787-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	112	70.0	130	----
QC-253787-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	101	70.0	130	----
QC-253787-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	113	40.0	160	----
QC-253787-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
QC-253787-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
QC-253787-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	112	70.0	130	----
QC-253787-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	109	70.0	130	----
QC-253787-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
QC-253787-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	110	70.0	130	----
QC-253787-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.5	70.0	130	----
QC-253787-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	96.1	70.0	130	----
QC-253787-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	113	70.0	130	----
QC-253787-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	110	70.0	130	----
QC-253787-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	114	70.0	130	----
QC-253787-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
QC-253787-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	102	70.0	130	----
QC-253787-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	116	70.0	130	----
QC-253787-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	110	70.0	130	----
QC-253787-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	111	70.0	130	----
QC-253787-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.6	40.0	160	----
QC-253787-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
QC-253787-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	120	70.0	130	----
QC-253787-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	103	70.0	130	----
QC-253787-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	114	70.0	130	----

Page : 11 of 11
 Work Order : VA21B5400
 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: 253787) - continued									
QC-253787-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-253787-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	102	70.0	130	----



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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	Email 3:	dskrypnik@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 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:		Fax:					

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
1	BA2130-A-1	21-Jul-21	9:00	Soil	X	X		X	1
2	BA2130-A-2	21-Jul-21	9:00	Soil	X	X		X	1
3	BA2130-A-3	21-Jul-21	9:00	Soil	X	X		X	1
4	BA2130-A-4	21-Jul-21	9:00	Soil	X	X		X	1
5	BA2130-A-5	21-Jul-21	9:00	Soil	X	X		X	1
6	BA2130-A-6	21-Jul-21	9:00	Soil	X	X		X	1
7	BA2130-A-7	21-Jul-21	9:00	Soil	X	X		X	1
8	BA2130-A-8	21-Jul-21	9:00	Soil	X	X		X	1
9	BA2130-A-9	21-Jul-21	9:00	Soil	X	X		X	1
10	BA2130-A-10	21-Jul-21	9:00	Soil	X	X		X	1
11	BA2130-A-11	21-Jul-21	9:00	Soil	X	X		X	1
12	BA2130-A-12	21-Jul-21	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA21B5400



Telephone : +1 604 253 4186

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)			SHIPMENT VERIFICATION (lab use only)				
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
KI	26 July 21	3:00				24°C	JNV	July 27	11am	

GENF 20.00 Front

X 2 budgets 21 no fee