

Bottom Ash Data

2020 Week 39

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on October 14, 2020. The data represents bottom ash composite results for week 39 of 2020 (September 20, 2020 to September 26, 2020).

The bottom ash meets the requirements of Metro Vancouver's Bottom Ash Management Plan and is suitable for disposal.



CERTIFICATE OF ANALYSIS

Work Order : **VA20B6622**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : ----
PO : VANCO 0000049378
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 : +1 604 253 4188
Date Samples Received : 29-Sep-2020 11:40
Date Analysis Commenced : 04-Oct-2020
Issue Date : 13-Oct-2020 15:50

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>
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Cristina Alexandre	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Russell Zhang		Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2039-A-1	BA2039-A-2	BA2039-A-3	BA2039-A-4	BA2039-A-5
(Matrix: Soil/Solid)					Client sampling date / time	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-001	VA20B6622-002	VA20B6622-003	VA20B6622-004	VA20B6622-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	26.3	25.0	25.4	24.9	25.6	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.4	10.4	10.3	10.4	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	27500	40500	28900	36900	35900	
antimony	7440-36-0	E440	0.10	mg/kg	156	145	141	158	168	
arsenic	7440-38-2	E440	0.10	mg/kg	32.4	37.1	32.8	34.7	35.6	
barium	7440-39-3	E440	0.50	mg/kg	529	460	448	529	521	
beryllium	7440-41-7	E440	0.10	mg/kg	0.32	0.38	0.33	0.35	0.39	
bismuth	7440-69-9	E440	0.20	mg/kg	14.9	19.3	11.5	15.5	11.9	
boron	7440-42-8	E440	5.0	mg/kg	155	239	214	183	226	
cadmium	7440-43-9	E440	0.020	mg/kg	15.1	18.6	17.2	15.7	14.9	
calcium	7440-70-2	E440	50	mg/kg	120000	126000	117000	124000	129000	
chromium	7440-47-3	E440	0.50	mg/kg	168	205	292	189	178	
cobalt	7440-48-4	E440	0.10	mg/kg	71.1	160	35.6	37.5	38.2	
copper	7440-50-8	E440	0.50	mg/kg	4460	2230	5390	3350	3350	
iron	7439-89-6	E440	50	mg/kg	76200	70000	75800	72400	58000	
lead	7439-92-1	E440	0.50	mg/kg	390	431	786	1000	498	
lithium	7439-93-2	E440	2.0	mg/kg	18.5	20.3	22.4	20.2	21.4	
magnesium	7439-95-4	E440	20	mg/kg	10800	11000	10400	10800	10900	
manganese	7439-96-5	E440	1.0	mg/kg	793	896	1230	803	1060	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.250	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	18.7	18.9	21.9	19.8	19.7	
nickel	7440-02-0	E440	0.50	mg/kg	151	135	148	162	150	
phosphorus	7723-14-0	E440	50	mg/kg	9920	11700	10100	11200	13100	
potassium	7440-09-7	E440	100	mg/kg	5300	5450	4920	5820	6160	
selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.40	0.28	0.46	0.39	
silver	7440-22-4	E440.Ag	0.10	mg/kg	7.15	----	5.83	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	8.05	----	9.65	6.31	
sodium	7440-23-5	E440	50	mg/kg	13300	14000	12600	14400	14600	
strontium	7440-24-6	E440	0.50	mg/kg	450	271	260	281	284	



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2039-A-1	BA2039-A-2	BA2039-A-3	BA2039-A-4	BA2039-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-001	VA20B6622-002	VA20B6622-003	VA20B6622-004	VA20B6622-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	15100	15700	13200	16200	15500	
thallium	7440-28-0	E440	0.050	mg/kg	0.067	0.071	0.065	0.077	0.079	
tin	7440-31-5	E440	2.0	mg/kg	394	137	116	122	349	
titanium	7440-32-6	E440	1.0	mg/kg	751	863	567	1070	494	
tungsten	7440-33-7	E440	0.50	mg/kg	8.70	7.01	49.3	13.5	7.62	
uranium	7440-61-1	E440	0.050	mg/kg	5.31	5.70	5.17	5.62	5.78	
vanadium	7440-62-2	E440	0.20	mg/kg	52.8	55.8	48.0	52.6	53.4	
zinc	7440-66-6	E440	2.0	mg/kg	5250	4300	5180	4740	5270	
zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	2.0	1.4	1.9	1.5	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.2	11.3	11.3	11.2	11.2	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.42	8.91	8.73	8.25	8.22	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90	
pH, TCLP final	----	EPP444	0.010	pH units	5.95	6.06	6.18	6.23	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	2.05	2.35	2.24	2.38	2.48	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.264	0.224	0.202	0.201	0.207	
calcium, TCLP	7440-70-2	E444	10	mg/L	1890	1950	1940	2020	2010	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.668	0.825	0.441	0.968	0.590	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.802	1.08	0.769	0.789	0.553	
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	123	128	127	131	134	
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.54	0.46	0.46	0.46	0.55	
selenium, TCLP	7782-49-2	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2039-A-1	BA2039-A-2	BA2039-A-3	BA2039-A-4	BA2039-A-5
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-001	VA20B6622-002	VA20B6622-003	VA20B6622-004	VA20B6622-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
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	75.5	50.9	44.4	42.4	54.0	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2039-A-6	BA2039-A-7	BA2039-A-8	BA2039-A-9	BA2039-A-10
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-006	VA20B6622-007	VA20B6622-008	VA20B6622-009	VA20B6622-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	25.4	25.4	23.5	25.6	26.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	10.3	10.4	10.3
Metals									
aluminum	7429-90-5	E440	50	mg/kg	32700	39700	33000	36800	40900
antimony	7440-36-0	E440	0.10	mg/kg	163	179	156	183	155
arsenic	7440-38-2	E440	0.10	mg/kg	32.6	30.7	36.4	34.0	35.9
barium	7440-39-3	E440	0.50	mg/kg	518	586	508	505	533
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.36	0.35	0.36	0.37
bismuth	7440-69-9	E440	0.20	mg/kg	17.0	11.3	13.6	12.3	11.2
boron	7440-42-8	E440	5.0	mg/kg	245	230	211	198	199
cadmium	7440-43-9	E440	0.020	mg/kg	16.4	16.1	16.6	16.0	46.2
calcium	7440-70-2	E440	50	mg/kg	127000	131000	132000	126000	130000
chromium	7440-47-3	E440	0.50	mg/kg	193	335	192	176	155
cobalt	7440-48-4	E440	0.10	mg/kg	127	42.2	127	46.8	76.5
copper	7440-50-8	E440	0.50	mg/kg	8730	3520	2760	2830	3420
iron	7439-89-6	E440	50	mg/kg	59400	62700	54800	79100	60900
lead	7439-92-1	E440	0.50	mg/kg	508	375	522	778	481
lithium	7439-93-2	E440	2.0	mg/kg	17.8	20.5	18.4	18.6	25.1
magnesium	7439-95-4	E440	20	mg/kg	10300	11300	10600	10700	10400
manganese	7439-96-5	E440	1.0	mg/kg	782	693	1010	941	826
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.0551	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	17.3	17.7	22.1	25.6	23.4
nickel	7440-02-0	E440	0.50	mg/kg	175	159	182	140	93.4
phosphorus	7723-14-0	E440	50	mg/kg	10500	13400	12800	10700	12500
potassium	7440-09-7	E440	100	mg/kg	5300	5280	5870	5520	5490
selenium	7782-49-2	E440	0.20	mg/kg	0.40	0.36	0.39	0.38	0.34
silver	7440-22-4	E440	0.10	mg/kg	17.8	5.30	7.54	6.13	5.16
sodium	7440-23-5	E440	50	mg/kg	13500	14100	14200	13300	13200
strontium	7440-24-6	E440	0.50	mg/kg	294	281	287	272	287
sulfur	7704-34-9	E440	1000	mg/kg	15200	14300	16300	16600	15800
thallium	7440-28-0	E440	0.050	mg/kg	0.077	0.068	0.070	0.082	0.075



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2039-A-6	BA2039-A-7	BA2039-A-8	BA2039-A-9	BA2039-A-10
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-006	VA20B6622-007	VA20B6622-008	VA20B6622-009	VA20B6622-010
					Result	Result	Result	Result	Result
Metals									
tin	7440-31-5	E440	2.0	mg/kg	3760	1340	212	149	132
titanium	7440-32-6	E440	1.0	mg/kg	552	580	561	850	906
tungsten	7440-33-7	E440	0.50	mg/kg	8.27	6.96	6.47	9.72	11.9
uranium	7440-61-1	E440	0.050	mg/kg	5.87	5.54	5.99	5.88	5.68
vanadium	7440-62-2	E440	0.20	mg/kg	64.1	54.8	59.0	56.0	55.4
zinc	7440-66-6	E440	2.0	mg/kg	6060	5070	5360	5780	4530
zirconium	7440-67-7	E440	1.0	mg/kg	1.1	1.6	1.3	1.5	2.2
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.3	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.93	9.15	8.78	8.80	8.43
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	2.90	2.90	2.90
pH, TCLP final	----	EPP444	0.010	pH units	5.93	6.12	5.95	5.89	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	2.45	2.30	2.36	2.66	2.26
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.224	0.636	0.336	0.250	0.251
calcium, TCLP	7440-70-2	E444	10	mg/L	2130	1930	2030	1970	1960
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	0.563	0.537	1.16	1.23	1.23
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.03	1.13	1.15	1.22	0.901
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	0.26	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	130	125	140	134	135
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.51	0.47	0.76	0.75	0.52
selenium, TCLP	7782-49-2	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00
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
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	BA2039-A-6	BA2039-A-7	BA2039-A-8	BA2039-A-9	BA2039-A-10
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00	23-Sep-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-006	VA20B6622-007	VA20B6622-008	VA20B6622-009	VA20B6622-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
zinc, TCLP	7440-66-6	E444	0.50	mg/L	70.9	52.6	58.4	55.6	67.1	

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2039-A-11	BA2039-A-12	----	----	----
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-011	VA20B6622-012	-----	-----	-----
					Result	Result	---	---	---
Physical Tests									
moisture	----	E144	0.25	%	23.2	19.8	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	----	----	----
Metals									
aluminum	7429-90-5	E440	50	mg/kg	28200	39400	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg	219	164	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg	38.0	35.7	----	----	----
barium	7440-39-3	E440	0.50	mg/kg	396	443	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.37	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg	17.7	11.6	----	----	----
boron	7440-42-8	E440	5.0	mg/kg	197	224	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg	13.4	16.2	----	----	----
calcium	7440-70-2	E440	50	mg/kg	120000	124000	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg	160	154	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg	55.5	288	----	----	----
copper	7440-50-8	E440	0.50	mg/kg	3560	2460	----	----	----
iron	7439-89-6	E440	50	mg/kg	67500	49900	----	----	----
lead	7439-92-1	E440	0.50	mg/kg	1560	506	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg	17.7	29.7	----	----	----
magnesium	7439-95-4	E440	20	mg/kg	10800	11900	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg	812	932	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg	33.5	18.4	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg	328	98.8	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg	10600	12100	----	----	----
potassium	7440-09-7	E440	100	mg/kg	5890	6420	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg	0.37	0.39	----	----	----
silver	7440-22-4	E440	0.10	mg/kg	5.83	12.4	----	----	----
sodium	7440-23-5	E440	50	mg/kg	15000	15600	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg	263	282	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg	14900	16500	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg	0.069	0.076	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2039-A-11	BA2039-A-12	----	----	----
Client sampling date / time					23-Sep-2020 09:00	23-Sep-2020 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-011	VA20B6622-012	-----	-----	-----
					Result	Result	---	---	---
Metals									
tin	7440-31-5	E440	2.0	mg/kg	167	117	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg	447	772	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg	6.14	11.6	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg	5.71	6.00	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg	55.7	59.3	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg	5240	5160	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.6	----	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	----	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.18	8.74	----	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.90	2.90	----	----	----
pH, TCLP final	----	EPP444	0.010	pH units	6.10	5.85	----	----	----
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	2.27	2.57	----	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.339	0.473	----	----	----
calcium, TCLP	7440-70-2	E444	10	mg/L	1990	1990	----	----	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.858	0.745	----	----	----
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.532	1.33	----	----	----
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	136	133	----	----	----
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	----	----	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.68	0.50	----	----	----
selenium, TCLP	7782-49-2	E444	1.00	mg/L	<1.00	<1.00	----	----	----
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	----	----	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2039-A-11	BA2039-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	23-Sep-2020 09:00	23-Sep-2020 09:00	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA20B6622-011	VA20B6622-012	-----	-----	-----	
TCLP Metals					Result	Result	---	---	---	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	67.7	104	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20B6622	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	: +1 604 253 4188
Project	: ----	Date Samples Received	: 29-Sep-2020 11:40
PO	: VANCO 0000049378	Issue Date	: 13-Oct-2020 15:50
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	VA20B6622-001	BA2039-A-1	boron	7440-42-8	E440	81.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	copper	7440-50-8	E440	43.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	lithium	7439-93-2	E440	30.7 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	molybdenum	7439-98-7	E440	62.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	nickel	7440-02-0	E440	86.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	strontium	7440-24-6	E440	50.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	tin	7440-31-5	E440	93.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B6622-001	BA2039-A-1	titanium	7440-32-6	E440	44.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 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 BA2039-A-1	E440.Ag	23-Sep-2020	08-Oct-2020	180 days	14 days	✓	08-Oct-2020	165 days	0 days	✓	
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2039-A-3	E440.Ag	23-Sep-2020	08-Oct-2020	180 days	14 days	✓	08-Oct-2020	165 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-1	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✓	07-Oct-2020	14 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-10	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✓	07-Oct-2020	14 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-11	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✓	07-Oct-2020	14 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-12	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✓	07-Oct-2020	14 days	0 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-2	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✓	07-Oct-2020	14 days	0 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 BA2039-A-3	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-4	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-5	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-6	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-7	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-8	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2039-A-9	E510	23-Sep-2020	07-Oct-2020	28 days	13 days	✔	07-Oct-2020	14 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2039-A-1	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2039-A-10	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-11	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-12	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-2	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-3	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-4	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-5	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-6	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-7	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICMS											
LDPE bag BA2039-A-8	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 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 BA2039-A-9	E440	23-Sep-2020	07-Oct-2020	180 days	13 days	✔	07-Oct-2020	166 days	0 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-1	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-10	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-11	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-12	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-2	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-3	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-4	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-5	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		



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 BA2039-A-6	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-7	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-8	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2039-A-9	E144	23-Sep-2020	----	----	----		05-Oct-2020	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-1	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-10	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-11	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-12	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-2	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 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 BA2039-A-3	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-4	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-5	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-6	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-7	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-8	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2039-A-9	E108	23-Sep-2020	07-Oct-2020	30 days	13 days	✔	07-Oct-2020	16 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-1	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-10	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 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)											
Glass vial - total (lab preserved) BA2039-A-11	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-12	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-2	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-3	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-4	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-5	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-6	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-7	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2039-A-8	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 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)											
Glass vial - total (lab preserved) BA2039-A-9	E512	04-Oct-2020	----	----	----		06-Oct-2020	0 days	0 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-1	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-10	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-11	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-12	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-2	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-3	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-4	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2039-A-5	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 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) BA2039-A-6	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2039-A-7	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2039-A-8	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2039-A-9	E444	04-Oct-2020	----	----	----		06-Oct-2020	191 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) BA2039-A-1	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-10	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-11	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-12	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-2	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----	



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) BA2039-A-3	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-4	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-5	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-6	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-7	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-8	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2039-A-9	EPP444	23-Sep-2020	04-Oct-2020	----	----		----	----	----		

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	97432	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	97433	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	97438	1	20	5.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	97435	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	99262	1	2	50.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	97432	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	97433	2	20	10.0	10.0	✔
Moisture Content by Gravimetry	E144	97438	1	20	5.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	97435	1	13	7.6	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	99262	1	2	50.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	97890	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	97432	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	97889	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	97433	1	20	5.0	5.0	✔
Moisture Content by Gravimetry	E144	97438	1	20	5.0	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	97890	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	97889	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	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 : VA20B6622

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 : ----
PO : VANCO 0000049378
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 : +1 604 253 4188
Date Samples Received : 29-Sep-2020 11:40
Date Analysis Commenced : 04-Oct-2020
Issue Date : 13-Oct-2020 15:50

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 Brianna Allen, Cristina Alexandre, Dee Lee, Kim Jensen, and Russell Zhang.

Page : 2 of 11
Work Order : VA20B6622
Client : Covanta Burnaby Renewable Energy, ULC
Project : ----



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: 97435)											
VA20B6622-001	BA2039-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	0.486%	5%	----
Physical Tests (QC Lot: 97438)											
VA20B6622-001	BA2039-A-1	moisture	----	E144	0.25	%	26.3	26.1	0.585%	20%	----
Metals (QC Lot: 97432)											
VA20B6622-001	BA2039-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 97433)											
VA20B6622-001	BA2039-A-1	aluminum	7429-90-5	E440	50	mg/kg	27500	41100	39.7%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	156	134	14.9%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	32.4	31.0	4.58%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	529	542	2.45%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.32	0.35	0.03	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	14.9	13.2	12.4%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	155	366	81.2%	30%	DUP-H
		cadmium	7440-43-9	E440	0.020	mg/kg	15.1	12.3	20.4%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	120000	120000	0.264%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	168	214	23.8%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	71.1	68.5	3.68%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	4460	2870	43.5%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	76200	68700	10.4%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	390	533	31.1%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	18.5	25.2	30.7%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	10800	11000	2.78%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	793	793	0.0376%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	18.7	35.8	62.6%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	151	379	86.2%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	9920	10700	7.69%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	5300	5560	4.80%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.36	0.35	0.01	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	13300	14300	7.86%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	450	268	50.8%	40%	DUP-H
		sulfur	7704-34-9	E440	1000	mg/kg	15100	14000	7.27%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.067	0.064	0.003	Diff <2x LOR	----



Sub-Matrix: Soil/Solid					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 97433) - continued											
VA20B6622-001	BA2039-A-1	tin	7440-31-5	E440	2.0	mg/kg	394	142	93.9%	40%	DUP-H
		titanium	7440-32-6	E440	1.0	mg/kg	751	1180	44.4%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	8.70	7.51	14.7%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.31	5.17	2.73%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	52.8	54.8	3.74%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	5250	4410	17.3%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	1.9	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: 97438)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 97432)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 97433)						
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: 97433) - 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: 99262)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 97889)						
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	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
TCLP Metals (QCLot: 97890)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 97435)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 97438)									
moisture	----	E144	0.25	%	50 %	98.8	90.0	110	----
Metals (QCLot: 97432)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Metals (QCLot: 97433)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	107	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	106	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	106	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.5	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	109	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	99.0	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	100.0	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	98.2	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	107	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	113	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	93.0	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	112	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	106	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	111	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	107	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	96.5	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	105	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	109	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: 97433) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	110	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	111	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	108	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
Metals (QCLot: 99262)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	102	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: 97889)										
VA20B6622-001	BA2039-A-1	antimony, TCLP	7440-36-0	E444	4.8 mg/L	5 mg/L	97.1	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.9 mg/L	5 mg/L	97.3	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.7 mg/L	12.5 mg/L	93.7	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.228 mg/L	0.25 mg/L	91.3	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.25 mg/L	10 mg/L	92.5	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	1.18 mg/L	1.25 mg/L	94.3	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	2.24 mg/L	2.5 mg/L	89.7	50.0	140	----
		iron, TCLP	7439-89-6	E444	244 mg/L	250 mg/L	97.6	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.3 mg/L	10 mg/L	103	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	257 mg/L	250 mg/L	103	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.31 mg/L	2.5 mg/L	92.6	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.95 mg/L	5 mg/L	99.1	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.106 mg/L	0.1 mg/L	106	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.6	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.73 mg/L	0.75 mg/L	97.1	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
TCLP Metals (QCLot: 97890)										
VA20B6622-001	BA2039-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	96.0	50.0	140	----



Reference Material (RM) Report

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

Sub-Matrix: Soil/Solid

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 97432)									
QC-97432-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	105	70.0	130	----
Metals (QCLot: 97433)									
QC-97433-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	104	70.0	130	----
QC-97433-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	104	70.0	130	----
QC-97433-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	106	70.0	130	----
QC-97433-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	101	70.0	130	----
QC-97433-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
QC-97433-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	115	40.0	160	----
QC-97433-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	104	70.0	130	----
QC-97433-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	99.6	70.0	130	----
QC-97433-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	108	70.0	130	----
QC-97433-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	103	70.0	130	----
QC-97433-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	101	70.0	130	----
QC-97433-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-97433-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	99.6	70.0	130	----
QC-97433-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	98.8	70.0	130	----
QC-97433-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	106	70.0	130	----
QC-97433-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	104	70.0	130	----
QC-97433-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	107	70.0	130	----
QC-97433-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-97433-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	106	70.0	130	----
QC-97433-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	112	70.0	130	----
QC-97433-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	103	70.0	130	----
QC-97433-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	101	70.0	130	----
QC-97433-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.6	40.0	160	----
QC-97433-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	96.0	70.0	130	----
QC-97433-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	115	70.0	130	----
QC-97433-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	107	70.0	130	----
QC-97433-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----

Page : 11 of 11
 Work Order : VA20B6622
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : ----



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: 97433) - continued									
QC-97433-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	101	70.0	130	----
QC-97433-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	101	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To		Report Format / Distribution				Service Requested (Rush for routine analysis subject to availability)					
Company:	Covanta Energy	<input type="checkbox"/> Standard <input type="checkbox"/> Other		<input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital <input type="checkbox"/> Fax		<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days) <input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT <input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT					
Contact:	Steve Mckinney / Dan Skrypnik	Email 1:	smckinney@covanta.com								
Address:	5150 Riverbend Drive Burnaby BC	Email 2:	rjohnson4@covanta.com								
Phone:	604-521-1025	Fax:									
	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com								
			brent.kirkpatrick@metrovancover.org								
			Sarah.Wellman@metrovancover.org								

Invoice To		Client / Project Information				Analysis Request					
Same as Report ?		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:											

Lab Work Order # (lab use only)		ALS Contact:		Sampler:		MET-TCLP-VA (all metals, Hg)		MOISTURE		Chrome 6		MET-CSR+FULL-VA (all metals)		Number of Containers	
------------------------------------	--	--------------	--	----------	--	------------------------------	--	----------	--	----------	--	------------------------------	--	----------------------	--

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						
BA2039-A-1		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-2		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-3		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-4		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-5		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-6		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-7		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-8		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-9		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-10		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-11		23-Sep-20	9:00	Soil	X	X		X							1
BA2039-A-12		23-Sep-20	9:00	Soil	X	X		X							1

Environmental Division
Vancouver
Work Order Reference
VA20B6622

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)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
<i>[Signature]</i>	29-Sep-20	0800	cmv	29/09/20	11:40am	18.4 °C				