

Bottom Ash Data

2020 Week 44

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on November 23, 2020. The data represents bottom ash composite results for week 44 of 2020 (October 25, 2020 to October 31, 2020).

The bottom ash weekly results do not meet the requirements of Metro Vancouver's Bottom Ash Management Plan; per the Plan week 44 bottom ash is on hold pending completion of the daily composite sample laboratory analysis.



CERTIFICATE OF ANALYSIS

Work Order : **VA20B9865**
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 : 30
No. of samples analysed : 30

Page : 1 of 12
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 03-Nov-2020 12:00
Date Analysis Commenced : 04-Nov-2020
Issue Date : 20-Nov-2020 15:17

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>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2044-A-1	BA2044-A-2	BA2044-A-3	BA2044-A-4	BA2044-A-5
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-001	VA20B9865-002	VA20B9865-003	VA20B9865-004	VA20B9865-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	22.8	21.7	22.3	22.0	23.5
pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.1	10.3	10.3	10.3
Metals									
aluminum	7429-90-5	E440	50	mg/kg	34100	36800	42300	37800	33700
antimony	7440-36-0	E440	0.10	mg/kg	141	111	139	131	121
arsenic	7440-38-2	E440	0.10	mg/kg	33.1	27.7	28.4	30.7	26.2
barium	7440-39-3	E440	0.50	mg/kg	503	459	523	507	623
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.48	0.37	0.51	0.39
bismuth	7440-69-9	E440	0.20	mg/kg	9.76	27.6	266	9.64	7.52
boron	7440-42-8	E440	5.0	mg/kg	198	167	205	186	173
cadmium	7440-43-9	E440	0.020	mg/kg	19.6	17.4	19.9	23.6	16.7
calcium	7440-70-2	E440	50	mg/kg	135000	132000	135000	139000	131000
chromium	7440-47-3	E440	0.50	mg/kg	187	137	188	207	160
cobalt	7440-48-4	E440	0.10	mg/kg	797	160	163	29.9	96.7
copper	7440-50-8	E440	0.50	mg/kg	15200	2140	4230	9930	1670
iron	7439-89-6	E440	50	mg/kg	66000	59300	61500	59300	53600
lead	7439-92-1	E440	0.50	mg/kg	476	476	461	679	917
lithium	7439-93-2	E440	2.0	mg/kg	65.2	25.6	19.4	20.8	21.8
magnesium	7439-95-4	E440	20	mg/kg	10800	10600	10600	11800	11200
manganese	7439-96-5	E440	1.0	mg/kg	1000	800	878	1100	823
mercury	7439-97-6	E510	0.0500	mg/kg	0.166	0.166	0.184	0.261	0.188
molybdenum	7439-98-7	E440	0.10	mg/kg	20.4	15.9	17.7	21.1	34.3
nickel	7440-02-0	E440	0.50	mg/kg	162	166	345	364	164
phosphorus	7723-14-0	E440	50	mg/kg	10500	10200	10800	10500	10200
potassium	7440-09-7	E440	100	mg/kg	4910	4920	5080	5590	5220
selenium	7782-49-2	E440	0.20	mg/kg	0.54	0.39	0.41	0.52	0.38
silver	7440-22-4	E440	0.10	mg/kg	5.05	16.0	4.26	14.8	3.68
sodium	7440-23-5	E440	50	mg/kg	14000	13500	14200	13900	15000
strontium	7440-24-6	E440	0.50	mg/kg	343	283	312	343	315
sulfur	7704-34-9	E440	1000	mg/kg	13400	12900	13000	13700	12300



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2044-A-1	BA2044-A-2	BA2044-A-3	BA2044-A-4	BA2044-A-5
(Matrix: Soil/Solid)										
Client sampling date / time						28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-001	VA20B9865-002	VA20B9865-003	VA20B9865-004	VA20B9865-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.115	0.072	0.078	0.082	0.079	
tin	7440-31-5	E440	2.0	mg/kg	160	127	131	257	172	
titanium	7440-32-6	E440	1.0	mg/kg	371	244	330	367	617	
tungsten	7440-33-7	E440	0.50	mg/kg	4.24	3.99	3.48	3.68	4.12	
uranium	7440-61-1	E440	0.050	mg/kg	5.47	5.41	5.34	5.90	5.63	
vanadium	7440-62-2	E440	0.20	mg/kg	81.2	218	68.8	72.9	101	
zinc	7440-66-6	E440	2.0	mg/kg	13600	4880	5330	5340	4360	
zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.3	2.8	2.4	1.5	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.5	11.4	11.4	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.87	8.27	6.78	7.23	7.50	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	2.91	2.91	2.91	
pH, TCLP final	----	EPP444	0.010	pH units	5.49	5.63	6.18	5.78	5.80	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	1.3	
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	2.07	2.02	2.04	2.29	2.38	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.271	0.511	0.238	0.643	0.337	
calcium, TCLP	7440-70-2	E444	10	mg/L	2040	2110	2060	2290	2290	
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	0.834	0.817	0.750	1.36	1.46	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.57	0.871	0.248	1.68	1.20	
iron, TCLP	7439-89-6	E444	5.0	mg/L	12.1	<5.0	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	0.35	0.58	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	124	131	120	137	138	
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	0.62	0.70	0.54	0.59	0.70	
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	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2044-A-1	BA2044-A-2	BA2044-A-3	BA2044-A-4	BA2044-A-5
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-001	VA20B9865-002	VA20B9865-003	VA20B9865-004	VA20B9865-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
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	76.7	50.3	42.6	66.4	67.3	

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)					BA2044-A-6	BA2044-A-7	BA2044-A-8	BA2044-A-9	BA2044-A-10
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-006	VA20B9865-007	VA20B9865-008	VA20B9865-009	VA20B9865-010
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	22.1	21.9	22.4	21.5	23.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.2	10.2	10.3	10.2
Metals									
aluminum	7429-90-5	E440	50	mg/kg	33400	35200	29900	35300	27600
antimony	7440-36-0	E440	0.10	mg/kg	148	136	143	132	129
arsenic	7440-38-2	E440	0.10	mg/kg	31.4	33.1	31.3	39.7	35.3
barium	7440-39-3	E440	0.50	mg/kg	458	595	495	483	378
beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.42	0.37	0.37	0.35
bismuth	7440-69-9	E440	0.20	mg/kg	11.4	33.1	8.08	8.44	7.86
boron	7440-42-8	E440	5.0	mg/kg	195	205	138	180	149
cadmium	7440-43-9	E440	0.020	mg/kg	20.6	20.6	19.4	21.3	19.4
calcium	7440-70-2	E440	50	mg/kg	138000	141000	132000	138000	125000
chromium	7440-47-3	E440	0.50	mg/kg	287	181	307	154	125
cobalt	7440-48-4	E440	0.10	mg/kg	60.6	92.3	28.6	27.9	36.8
copper	7440-50-8	E440	0.50	mg/kg	2220	2260	10600	4770	1940
iron	7439-89-6	E440	50	mg/kg	53900	58600	54900	50700	55500
lead	7439-92-1	E440	0.50	mg/kg	864	535	604	600	394
lithium	7439-93-2	E440	2.0	mg/kg	23.5	18.5	19.3	19.3	16.8
magnesium	7439-95-4	E440	20	mg/kg	11000	11400	12300	10900	10000
manganese	7439-96-5	E440	1.0	mg/kg	984	930	794	794	739
mercury	7439-97-6	E510	0.0500	mg/kg	0.242	0.268	0.251	0.202	0.226
molybdenum	7439-98-7	E440	0.10	mg/kg	21.8	22.5	29.4	19.0	19.4
nickel	7440-02-0	E440	0.50	mg/kg	254	205	203	147	123
phosphorus	7723-14-0	E440	50	mg/kg	10900	10700	10300	11000	9740
potassium	7440-09-7	E440	100	mg/kg	5290	5450	5570	5270	5110
selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.52	0.52	0.51	0.45
silver	7440-22-4	E440	0.10	mg/kg	5.69	4.42	4.14	3.58	6.05
sodium	7440-23-5	E440	50	mg/kg	14800	14300	14000	14700	13400
strontium	7440-24-6	E440	0.50	mg/kg	331	343	310	334	301
sulfur	7704-34-9	E440	1000	mg/kg	16500	13700	14000	14200	13400
thallium	7440-28-0	E440	0.050	mg/kg	0.097	0.095	0.092	0.084	0.072



Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2044-A-6	BA2044-A-7	BA2044-A-8	BA2044-A-9	BA2044-A-10
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-006	VA20B9865-007	VA20B9865-008	VA20B9865-009	VA20B9865-010
					Result	Result	Result	Result	Result
Metals									
tin	7440-31-5	E440	2.0	mg/kg	153	145	132	128	134
titanium	7440-32-6	E440	1.0	mg/kg	384	388	279	281	195
tungsten	7440-33-7	E440	0.50	mg/kg	4.38	4.87	7.59	3.76	4.23
uranium	7440-61-1	E440	0.050	mg/kg	6.46	5.93	5.96	6.26	5.35
vanadium	7440-62-2	E440	0.20	mg/kg	74.2	105	110	74.1	83.6
zinc	7440-66-6	E440	2.0	mg/kg	5440	6910	5280	4780	3950
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.4	1.5	2.0	1.8
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.4	11.3	11.5	11.3
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.57	6.89	7.99	5.06	7.28
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	2.91	2.91	2.91
pH, TCLP final	----	EPP444	0.010	pH units	5.64	5.74	5.61	5.65	6.08
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	2.19	2.10	2.66	2.24	2.07
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.308	0.327	1.45	1.45	0.277
calcium, TCLP	7440-70-2	E444	10	mg/L	2130	2240	2110	2110	2070
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	1.48	0.793	1.63	1.62	1.40
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.899	0.744	2.31	2.31	0.615
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	8.9	8.7	<5.0
lead, TCLP	7439-92-1	E444	0.25	mg/L	2.75	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	136	129	126	125	124
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	0.75	0.65	0.76	0.76	0.60
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					Client sample ID	BA2044-A-6	BA2044-A-7	BA2044-A-8	BA2044-A-9	BA2044-A-10
(Matrix: Soil/Solid)										
					Client sampling date / time	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-006	VA20B9865-007	VA20B9865-008	VA20B9865-009	VA20B9865-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
zinc, TCLP	7440-66-6	E444	0.50	mg/L	69.3	57.6	66.9	64.7	51.4	

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2044-A-11	BA2044-A-12	BA 2044- A-2 REP 1	BA 2044- A-2 REP 2	BA 2044- A-4 REP 1
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-011	VA20B9865-012	VA20B9865-013	VA20B9865-014	VA20B9865-015	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	22.8	22.9	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.4	10.3	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31400	29600	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	189	120	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	41.5	27.7	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	563	400	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.31	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	11.9	33.4	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	164	142	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	21.5	19.7	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	135000	119000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	171	143	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	352	87.5	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	3060	8430	----	----	----	
iron	7439-89-6	E440	50	mg/kg	72900	59500	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1990	666	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	32.6	18.0	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	11000	10300	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	996	736	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.254	0.220	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	19.0	16.7	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	135	111	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10900	8640	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	5550	4520	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.48	0.41	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	5.03	4.49	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	14400	12800	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	329	303	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	14500	11700	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.089	0.076	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2044-A-11	BA2044-A-12	BA 2044- A-2 REP 1	BA 2044- A-2 REP 2	BA 2044- A-4 REP 1
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-011	VA20B9865-012	VA20B9865-013	VA20B9865-014	VA20B9865-015	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	1130	320	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	494	228	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	4.76	3.04	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	6.04	5.31	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	79.6	59.8	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	6530	5360	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	2.3	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.2	11.5	11.5	11.4	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	6.20	5.60	8.27	8.27	7.23	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.91	2.91	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.05	6.02	5.97	5.81	6.10	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	----	----	----	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	----	----	----	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	----	----	----	
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.16	2.21	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.294	0.495	0.274	0.253	0.571	
calcium, TCLP	7440-70-2	E444	10	mg/L	2200	2260	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.657	0.727	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.00	0.941	----	----	----	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	134	136	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.63	0.59	----	----	----	
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	0.23	<0.15	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2044-A-11	BA2044-A-12	BA 2044- A-2 REP 1	BA 2044- A-2 REP 2	BA 2044- A-4 REP 1
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-011	VA20B9865-012	VA20B9865-013	VA20B9865-014	VA20B9865-015	
TCLP Metals					Result	Result	Result	Result	Result	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	47.0	52.6	----	----	----	

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA 2044- A-4 REP 2	BA 2044- A-8 REP 1	BA 2044- A-8 REP 2	BA 2044- A-8 REP 3	BA 2044- A-8 REP 4
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-016	VA20B9865-017	VA20B9865-018	VA20B9865-019	VA20B9865-020	
TCLP Metals					Result	Result	Result	Result	Result	
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.4	11.3	11.3	11.3	11.3	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.23	7.99	7.99	7.99	7.99	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89	
pH, TCLP final	----	EPP444	0.010	pH units	6.01	6.09	5.98	6.00	6.06	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.402	0.330	0.338	0.448	0.302	

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID				
					BA 2044- A-8 REP 5	BA 2044- A-8 REP 6	BA 2044- A-8 REP 7	BA 2044- A-9 REP 1	BA 2044- A-9 REP 2
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-021	VA20B9865-022	VA20B9865-023	VA20B9865-024	VA20B9865-025
					Result	Result	Result	Result	Result
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.3	11.3	11.3	11.5	11.5
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.99	7.99	7.99	5.06	5.06
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444	0.010	pH units	5.97	6.04	6.11	6.02	5.94
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.300	0.306	0.294	1.90	0.268

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

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID				
					BA 2044- A-9 REP 3	BA 2044- A-9 REP 4	BA 2044- A-9 REP 5	BA 2044- A-9 REP 6	BA 2044- A-9 REP 7
Client sampling date / time					28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00	28-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B9865-026	VA20B9865-027	VA20B9865-028	VA20B9865-029	VA20B9865-030
					Result	Result	Result	Result	Result
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.5	11.5	11.5	11.5
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	5.06	5.06	5.06	5.06	5.06
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.89	2.89	2.89
pH, TCLP final	----	EPP444	0.010	pH units	5.98	5.93	6.04	6.07	6.02
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.281	0.329	0.330	0.284	0.411

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20B9865	Page	: 1 of 20
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	: 03-Nov-2020 12:00
PO	: VANCO 0000049378	Issue Date	: 20-Nov-2020 15:17
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 30		
No. of samples analysed	: 30		

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	VA20B9865-001	BA2044-A-1	cobalt	7440-48-4	E440	185 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B9865-001	BA2044-A-1	copper	7440-50-8	E440	153 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B9865-001	BA2044-A-1	iron	7439-89-6	E440	32.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B9865-001	BA2044-A-1	lithium	7439-93-2	E440	91.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B9865-001	BA2044-A-1	tungsten	7440-33-7	E440	31.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B9865-001	BA2044-A-1	zinc	7440-66-6	E440	100 % 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 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 : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-1	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-10	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-11	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-12	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-2	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-3	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-4	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✓	12-Nov-2020	14 days	1 days	✓	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-5	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✔	12-Nov-2020	14 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-6	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✔	12-Nov-2020	14 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-7	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✔	12-Nov-2020	14 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-8	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✔	12-Nov-2020	14 days	1 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2044-A-9	E510	28-Oct-2020	10-Nov-2020	28 days	13 days	✔	12-Nov-2020	14 days	1 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2044-A-1	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2044-A-10	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2044-A-11	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2044-A-12	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-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 ICPCS											
LDPE bag BA2044-A-2	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-3	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-4	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-5	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-6	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-7	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-8	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2044-A-9	E440	28-Oct-2020	10-Nov-2020	180 days	13 days	✔	10-Nov-2020	166 days	0 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2044-A-1	E144	28-Oct-2020	----	----	----		04-Nov-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 BA2044-A-10	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-11	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-12	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-2	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-3	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-4	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-5	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-6	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2044-A-7	E144	28-Oct-2020	----	----	----		04-Nov-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 BA2044-A-8	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2044-A-9	E144	28-Oct-2020	----	----	----		04-Nov-2020	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-1	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-10	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-11	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-12	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-2	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-3	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-4	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-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 BA2044-A-5	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-6	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-7	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-8	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2044-A-9	E108	28-Oct-2020	10-Nov-2020	30 days	13 days	✔	10-Nov-2020	16 days	0 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-1	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-10	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-11	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-12	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	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)											
Glass vial - total (lab preserved) BA2044-A-2	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-3	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-4	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-5	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-6	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-7	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-8	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2044-A-9	E512	28-Oct-2020	----	----	----		09-Nov-2020	28 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE (lab preserved) BA2044-A-1	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	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 (lab preserved) BA2044-A-10	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-11	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-12	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-2	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-3	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-4	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-5	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-6	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE (lab preserved) BA2044-A-7	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	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 (lab preserved) BA2044-A-8	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE (lab preserved) BA2044-A-9	E444	28-Oct-2020	----	----	----		09-Nov-2020	180 days	12 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-2 REP 1	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-2 REP 2	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-4 REP 1	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-4 REP 2	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 1	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 2	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 3	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 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 (nitric acid) BA 2044- A-8 REP 4	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 5	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 6	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-8 REP 7	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-9 REP 1	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-9 REP 2	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-9 REP 3	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-9 REP 4	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE total (nitric acid) BA 2044- A-9 REP 5	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 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 (nitric acid) BA 2044- A-9 REP 6	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✓
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA 2044- A-9 REP 7	E444	17-Nov-2020	----	----	----		19-Nov-2020	200 days	22 days	✓
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-2 REP 1	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-2 REP 2	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-4 REP 1	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-4 REP 2	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 1	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 2	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 3	EPP444	28-Oct-2020	17-Nov-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) BA 2044- A-8 REP 4	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 5	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 6	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-8 REP 7	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 1	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 2	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 3	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 4	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 5	EPP444	28-Oct-2020	17-Nov-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) BA 2044- A-9 REP 6	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA 2044- A-9 REP 7	EPP444	28-Oct-2020	17-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-1	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-10	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-11	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-12	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-2	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-3	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-4	EPP444	28-Oct-2020	06-Nov-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: 28 day HT (e.g. Hg, CrVI) BA2044-A-5	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-6	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-7	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-8	EPP444	28-Oct-2020	06-Nov-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2044-A-9	EPP444	28-Oct-2020	06-Nov-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	113166	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	113167	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	113169	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	113168	1	12	8.3	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	113166	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	113167	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	113169	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	113168	1	12	8.3	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	115007	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	113166	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	119374	2	30	6.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	113167	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	113169	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	115007	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	119374	2	30	6.6	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.
Metals by CRC ICPMS (TCLP)	E444 Vancouver - Environmental	Soil/Solid	EPA 1311/6020B (mod)	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl, followed by CVAAS analysis.
Mercury by CVAAS (TCLP)	E512 Vancouver - Environmental	Soil/Solid	SW 846 -1311/245.1 CVAA ON TCLP LEACHATE	An extract produced by the Toxicity Characteristic Leachate Procedure (TCLP) as per EPA 1311 is analyzed by CVAAS.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
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.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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 : VA20B9865

Page : 1 of 13

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 : 30
No. of samples analysed : 30

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 : 03-Nov-2020 12:00
Date Analysis Commenced : 04-Nov-2020
Issue Date : 20-Nov-2020 15:17

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 Angela Ren (Team Leader - Metals), Dee Lee (Analyst), Kinny Wu (Lab Analyst), Ophelia Chiu (Supervisor - Organics Instrumentation), and Robin Weeks (Team Leader - Metals).

Page : 2 of 13
Work Order : VA20B9865
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: 113168)											
VA20B9865-001	BA2044-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.3	10.3	0.0974%	5%	----
Physical Tests (QC Lot: 113169)											
VA20B9865-001	BA2044-A-1	moisture	----	E144	0.25	%	22.8	21.0	8.29%	20%	----
Metals (QC Lot: 113166)											
VA20B9865-001	BA2044-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	0.166	0.172	0.0060	Diff <2x LOR	----
Metals (QC Lot: 113167)											
VA20B9865-001	BA2044-A-1	aluminum	7429-90-5	E440	50	mg/kg	34100	40500	17.2%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	141	131	7.12%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	33.1	27.1	20.1%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	503	438	13.9%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.36	0.01	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	9.76	8.66	11.9%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	198	168	16.5%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	19.6	18.8	4.47%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	135000	136000	0.639%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	187	221	16.6%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	797	31.8	185%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	15200	2050	153%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	66000	47600	32.5%	30%	DUP-H
		lead	7439-92-1	E440	0.50	mg/kg	476	498	4.54%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	65.2	24.4	91.0%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	10800	10700	1.46%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1000	752	28.8%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	20.4	16.1	23.8%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	162	202	22.0%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	10500	11400	8.82%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4910	4980	1.40%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.54	0.46	0.09	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	5.05	4.09	21.0%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	14000	14100	0.561%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	343	340	0.704%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	13400	13300	1.13%	30%	----



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: 113167) - continued											
VA20B9865-001	BA2044-A-1	thallium	7440-28-0	E440	0.050	mg/kg	0.115	0.076	0.040	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	160	135	16.8%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	371	267	32.5%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	4.24	3.09	31.5%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	5.47	5.55	1.51%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	81.2	76.1	6.47%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	13600	4500	100%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	1.9	2.2	0.3	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 113169)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 113166)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 113167)						
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: 113167) - 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	----
TCLP Metals (QCLot: 115007)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 115008)						
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: 119374)						
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	----



Sub-Matrix: **Soil/Solid**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
TCLP Metals (QCLot: 119374) - continued						
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	----



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: 113168)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 113169)									
moisture	----	E144	0.25	%	50 %	99.6	90.0	110	----
Metals (QCLot: 113166)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	101	80.0	120	----
Metals (QCLot: 113167)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	99.4	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	101	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	96.3	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	88.6	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	100	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	87.1	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	95.0	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	91.8	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	99.2	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	92.9	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	99.9	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	88.3	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	102	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	99.9	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.4	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	102	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	95.7	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	91.2	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	98.7	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	99.0	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	93.1	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Metals (QCLot: 113167) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	97.9	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	96.6	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	97.6	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	97.6	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	102	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	95.8	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	93.3	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

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	Target	MS	Low	High	
TCLP Metals (QCLot: 115007)										
VA20B9865-001	BA2044-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	93.2	50.0	140	----
TCLP Metals (QCLot: 115008)										
VA20B9865-001	BA2044-A-1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.6 mg/L	5 mg/L	91.8	50.0	140	----
		barium, TCLP	7440-39-3	E444	11.9 mg/L	12.5 mg/L	95.0	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.220 mg/L	0.25 mg/L	87.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.17 mg/L	10 mg/L	91.7	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	1.14 mg/L	1.25 mg/L	91.4	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	2.19 mg/L	2.5 mg/L	87.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	231 mg/L	250 mg/L	92.5	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	262 mg/L	250 mg/L	105	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.24 mg/L	2.5 mg/L	89.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.70 mg/L	5 mg/L	94.0	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.111 mg/L	0.1 mg/L	111	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	99.0	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	95.4	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
TCLP Metals (QCLot: 119374)										
VA20B9865-013	BA 2044- A-2 REP 1	antimony, TCLP	7440-36-0	E444	4.9 mg/L	5 mg/L	98.1	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.5 mg/L	5 mg/L	90.1	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.7 mg/L	12.5 mg/L	102	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.202 mg/L	0.25 mg/L	81.0	50.0	140	----
		boron, TCLP	7440-42-8	E444	7.86 mg/L	10 mg/L	78.6	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	1.12 mg/L	1.25 mg/L	90.0	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----



Sub-Matrix: **Soil/Solid**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
TCLP Metals (QCLot: 119374) - continued										
VA20B9865-013	BA 2044- A-2 REP 1	copper, TCLP	7440-50-8	E444	2.14 mg/L	2.5 mg/L	85.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	219 mg/L	250 mg/L	87.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.72 mg/L	10 mg/L	97.2	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	245 mg/L	250 mg/L	98.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.14 mg/L	2.5 mg/L	85.6	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.58 mg/L	5 mg/L	91.6	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	4.6 mg/L	5 mg/L	93.1	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.68 mg/L	0.75 mg/L	91.1	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	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: 113166)									
QC-113166-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Metals (QCLot: 113167)									
QC-113167-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	113	70.0	130	----
QC-113167-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	100.0	70.0	130	----
QC-113167-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
QC-113167-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	104	70.0	130	----
QC-113167-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	103	70.0	130	----
QC-113167-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
QC-113167-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	107	70.0	130	----
QC-113167-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	105	70.0	130	----
QC-113167-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
QC-113167-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-113167-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
QC-113167-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-113167-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	107	70.0	130	----
QC-113167-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	103	70.0	130	----
QC-113167-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	110	70.0	130	----
QC-113167-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	110	70.0	130	----
QC-113167-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	109	70.0	130	----
QC-113167-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-113167-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	108	70.0	130	----
QC-113167-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	116	70.0	130	----
QC-113167-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	107	70.0	130	----
QC-113167-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	105	70.0	130	----
QC-113167-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	99.6	40.0	160	----
QC-113167-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	100	70.0	130	----
QC-113167-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	124	70.0	130	----
QC-113167-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	111	70.0	130	----
QC-113167-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	112	70.0	130	----

Page : 13 of 13
 Work Order : VA20B9865
 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: 113167) - continued									
QC-113167-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	99.7	70.0	130	----
QC-113167-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	110	70.0	130	----



ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC #

Page ___ of ___

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

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

Lab Work Order # (lab use only)		ALS Contact:	Sampler:									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)				
	B9865											
	BA2044-A-1		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-2		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-3		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-4		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-5		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-6		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-7		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-8		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-9		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-10		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-11		28-Oct-20	9:00	Soil	X	X		X			1
	BA2044-A-12		28-Oct-20	9:00	Soil	X	X		X			1

Environmental Division
Vancouver
Work Order Reference
VA20B9865

Telephone : +1 604 263 4189

Special Instructions (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>	3-Nov-20	0800				20 °C	MB	Nov 3	12 PM	

Bottom Ash Worksheet

Date sample composited (DD/MM/YYYY)	02/11/2020
Person doing the sampling	Therim
Total Sample Weight before processing, kg	115
Weight of Material >3/8", kg	13.75
Weight of Material that cannot be processed to <3/8" (metal, wood, etc), kg	8.5
Final Total weight of Processed Bottom Ash, kg	106.5

1.1
32.5
35.3
35.2
12.0

115.0

Return this form with the filled Weekly Bottom Ash Composite Sample containers

Completely fill twelve (12) 500ml sample containers and label each with "Bottom Ash" and the week the ash composite is from, i.e. "June 9-15, 2019"