

## Bottom Ash Data

2020 Week 33

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The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on September 8, 2020. The data represents bottom ash composite results for week 33 of 2020 (August 9, 2020 to August 15, 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 : **VA20B3131**  
Client : **Covanta Burnaby Renewable Energy, ULC**  
Contact : Steve McKinney  
Address : 5150 Riverbend Drive  
Burnaby BC Canada V3N 4V3  
Telephone : 604 521 1025  
Project : Weekly Bottom Ash-Suite  
PO : VANCO 0000049378  
C-O-C number : ----  
Sampler : ----  
Site : ----  
Quote number : Standing Offer (BC work)  
No. of samples received : 20  
No. of samples analysed : 20

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 : 19-Aug-2020 11:05  
Date Analysis Commenced : 24-Aug-2020  
Issue Date : 08-Sep-2020 09:09

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
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## 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	BA2033-A-1	BA2033-A-2	BA2033-A-3	BA2033-A-4	BA2033-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-001	VA20B3131-002	VA20B3131-003	VA20B3131-004	VA20B3131-005	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
moisture	----	E144	0.25	%	19.8	18.0	20.0	18.8	19.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	10.6	11.0	10.8	10.9	
<b>Metals</b>										
aluminum	7429-90-5	E440	50	mg/kg	31700	34900	37100	30000	35000	
antimony	7440-36-0	E440	0.10	mg/kg	102	126	158	100	124	
arsenic	7440-38-2	E440	0.10	mg/kg	56.6	40.6	44.0	38.4	37.0	
barium	7440-39-3	E440	0.50	mg/kg	567	595	530	467	544	
beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.38	0.38	0.36	0.38	
bismuth	7440-69-9	E440	0.20	mg/kg	10.4	12.3	10.6	7.66	8.73	
boron	7440-42-8	E440	5.0	mg/kg	247	175	208	197	197	
cadmium	7440-43-9	E440	0.020	mg/kg	13.2	13.0	12.4	12.1	10.6	
calcium	7440-70-2	E440	50	mg/kg	122000	118000	122000	115000	122000	
chromium	7440-47-3	E440	0.50	mg/kg	229	185	194	128	172	
cobalt	7440-48-4	E440	0.10	mg/kg	31.6	100	42.4	76.9	41.8	
copper	7440-50-8	E440	0.50	mg/kg	2860	5280	1150	2600	3470	
iron	7439-89-6	E440	50	mg/kg	71000	74100	58400	59200	67400	
lead	7439-92-1	E440	0.50	mg/kg	481	432	2060	484	474	
lithium	7439-93-2	E440	2.0	mg/kg	26.5	17.4	19.5	16.8	16.3	
magnesium	7439-95-4	E440	20	mg/kg	11900	10800	11500	10800	11500	
manganese	7439-96-5	E440	1.0	mg/kg	842	896	792	758	817	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.0663	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	22.6	28.0	20.0	15.7	17.2	
nickel	7440-02-0	E440	0.50	mg/kg	193	262	391	128	139	
phosphorus	7723-14-0	E440	50	mg/kg	10400	10900	10600	9210	10200	
potassium	7440-09-7	E440	100	mg/kg	4670	4760	4490	4560	4720	
selenium	7782-49-2	E440	0.20	mg/kg	0.51	0.41	0.67	0.28	0.46	
silver	7440-22-4	E440	0.10	mg/kg	3.91	3.46	3.50	3.53	5.38	
sodium	7440-23-5	E440	50	mg/kg	13700	13800	13000	12200	13500	
strontium	7440-24-6	E440	0.50	mg/kg	301	306	292	282	269	
sulfur	7704-34-9	E440	1000	mg/kg	11500	11600	12100	10400	10600	



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2033-A-1	BA2033-A-2	BA2033-A-3	BA2033-A-4	BA2033-A-5
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-001	VA20B3131-002	VA20B3131-003	VA20B3131-004	VA20B3131-005
					Result	Result	Result	Result	Result
<b>Metals</b>									
thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0.063	0.055	<0.050
tin	7440-31-5	E440	2.0	mg/kg	98.5	115	116	126	1510
titanium	7440-32-6	E440	1.0	mg/kg	888	1200	926	633	1190
tungsten	7440-33-7	E440	0.50	mg/kg	5.66	5.97	6.19	4.10	4.51
uranium	7440-61-1	E440	0.050	mg/kg	4.32	4.81	4.33	4.87	4.79
vanadium	7440-62-2	E440	0.20	mg/kg	46.2	49.0	47.8	45.9	45.8
zinc	7440-66-6	E440	2.0	mg/kg	3720	4130	9190	3900	4430
zirconium	7440-67-7	E440	1.0	mg/kg	1.3	1.6	1.5	1.4	1.5
<b>TCLP Metals</b>									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	11.7	11.7	11.6
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.57	7.39	8.19	8.05	7.33
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	5.92	6.14	6.15	6.02	5.91
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
boron, TCLP	7440-42-8	E444	0.50	mg/L	2.21	2.34	2.51	2.16	2.51
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.203	1.26	0.251	0.430	0.363
calcium, TCLP	7440-70-2	E444	10	mg/L	1950	1900	2000	1970	2060
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	0.841	0.442	0.872	0.794	0.383
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.38	0.831	0.882	1.07	0.984
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	130	127	132	123	128
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	0.45	0.40	0.45	0.58	0.56
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	BA2033-A-1	BA2033-A-2	BA2033-A-3	BA2033-A-4	BA2033-A-5
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-001	VA20B3131-002	VA20B3131-003	VA20B3131-004	VA20B3131-005	
					Result	Result	Result	Result	Result	
<b>TCLP Metals</b>										
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	40.0	36.6	37.4	39.6	40.2	

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)					BA2033-A-6	BA2033-A-7	BA2033-A-8	BA2033-A-9	BA2033-A-10
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-006	VA20B3131-007	VA20B3131-008	VA20B3131-009	VA20B3131-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
moisture	----	E144	0.25	%	19.4	18.8	19.1	19.5	19.6
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	11.0	10.8	11.0	10.9
<b>Metals</b>									
aluminum	7429-90-5	E440	50	mg/kg	34000	32100	31300	30500	33600
antimony	7440-36-0	E440	0.10	mg/kg	136	107	149	107	132
arsenic	7440-38-2	E440	0.10	mg/kg	42.1	47.0	40.1	35.0	41.8
barium	7440-39-3	E440	0.50	mg/kg	502	614	540	620	526
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.48	0.37	0.42	0.37
bismuth	7440-69-9	E440	0.20	mg/kg	8.09	8.91	30.1	7.96	9.07
boron	7440-42-8	E440	5.0	mg/kg	173	223	270	185	173
cadmium	7440-43-9	E440	0.020	mg/kg	11.3	11.3	25.9	12.0	13.3
calcium	7440-70-2	E440	50	mg/kg	117000	127000	116000	115000	133000
chromium	7440-47-3	E440	0.50	mg/kg	243	179	241	197	234
cobalt	7440-48-4	E440	0.10	mg/kg	96.3	34.2	50.2	43.0	80.8
copper	7440-50-8	E440	0.50	mg/kg	6360	5340	3600	3160	1810
iron	7439-89-6	E440	50	mg/kg	66500	82000	82100	69700	75400
lead	7439-92-1	E440	0.50	mg/kg	348	560	373	526	467
lithium	7439-93-2	E440	2.0	mg/kg	20.8	17.4	16.1	14.2	15.0
magnesium	7439-95-4	E440	20	mg/kg	11400	11500	10200	11800	12300
manganese	7439-96-5	E440	1.0	mg/kg	743	992	6340	934	892
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
molybdenum	7439-98-7	E440	0.10	mg/kg	35.2	20.6	26.2	19.9	49.7
nickel	7440-02-0	E440	0.50	mg/kg	236	275	373	122	134
phosphorus	7723-14-0	E440	50	mg/kg	10700	9860	10800	10300	12900
potassium	7440-09-7	E440	100	mg/kg	4890	4860	5050	4670	4910
selenium	7782-49-2	E440	0.20	mg/kg	0.48	0.58	0.43	0.39	0.42
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	5.28	----	----
silver	7440-22-4	E440	0.10	mg/kg	3.93	7.03	----	3.51	7.15
sodium	7440-23-5	E440	50	mg/kg	13600	14100	14500	14100	14200
strontium	7440-24-6	E440	0.50	mg/kg	283	446	266	282	306
sulfur	7704-34-9	E440	1000	mg/kg	12700	11400	12600	10500	13200



## Analytical Results

Sub-Matrix: Soil					Client sample ID				
(Matrix: Soil/Solid)					BA2033-A-6	BA2033-A-7	BA2033-A-8	BA2033-A-9	BA2033-A-10
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-006	VA20B3131-007	VA20B3131-008	VA20B3131-009	VA20B3131-010
					Result	Result	Result	Result	Result
<b>Metals</b>									
thallium	7440-28-0	E440	0.050	mg/kg	0.056	<0.050	0.054	0.054	<0.050
tin	7440-31-5	E440	2.0	mg/kg	121	92.7	178	97.4	120
titanium	7440-32-6	E440	1.0	mg/kg	1020	753	895	769	669
tungsten	7440-33-7	E440	0.50	mg/kg	45.6	8.95	5.10	8.71	28.0
uranium	7440-61-1	E440	0.050	mg/kg	4.58	4.60	4.63	4.28	5.08
vanadium	7440-62-2	E440	0.20	mg/kg	89.0	55.3	45.2	50.6	93.2
zinc	7440-66-6	E440	2.0	mg/kg	5280	4090	5900	5100	4790
zirconium	7440-67-7	E440	1.0	mg/kg	1.5	1.2	1.2	1.1	1.2
<b>TCLP Metals</b>									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	11.6	11.6	11.6
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.91	9.04	8.85	9.01	8.69
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	6.13	6.08	6.11	6.09	5.81
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	2.27	2.32	2.19	2.10	2.29
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.207	1.41	0.196	0.163	0.193
calcium, TCLP	7440-70-2	E444	10	mg/L	1920	2000	1940	1890	2060
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	0.427	1.16	0.584	0.460	0.670
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.30	1.21	1.30	1.04	0.975
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	0.28	<0.25
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	136	133	131	121	145
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	0.43	0.48	0.54	0.41	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





## Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2033-A-6	BA2033-A-7	BA2033-A-8	BA2033-A-9	BA2033-A-10
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-006	VA20B3131-007	VA20B3131-008	VA20B3131-009	VA20B3131-010	
					Result	Result	Result	Result	Result	
<b>TCLP Metals</b>										
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	37.6	46.3	42.4	50.5	60.9	

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	BA2033-A-11	BA2033-A-12	BA2033-A-2 REP 1	BA2033-A-2 REP 2	BA2033-A-2 REP 3
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020	12-Aug-2020	12-Aug-2020	
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-011	VA20B3131-012	VA20B3131-013	VA20B3131-014	VA20B3131-015	
					Result	Result	Result	Result	Result	
<b>Physical Tests</b>										
moisture	---	E144	0.25	%	21.2	21.7	---	---	---	
pH (1:2 soil:water)	---	E108	0.10	pH units	10.8	10.9	---	---	---	
<b>Metals</b>										
aluminum	7429-90-5	E440	50	mg/kg	30300	34900	---	---	---	
antimony	7440-36-0	E440	0.10	mg/kg	156	125	---	---	---	
arsenic	7440-38-2	E440	0.10	mg/kg	52.0	34.7	---	---	---	
barium	7440-39-3	E440	0.50	mg/kg	479	437	---	---	---	
beryllium	7440-41-7	E440	0.10	mg/kg	0.34	0.36	---	---	---	
bismuth	7440-69-9	E440	0.20	mg/kg	13.9	8.34	---	---	---	
boron	7440-42-8	E440	5.0	mg/kg	184	195	---	---	---	
cadmium	7440-43-9	E440	0.020	mg/kg	50.7	43.9	---	---	---	
calcium	7440-70-2	E440	50	mg/kg	133000	120000	---	---	---	
chromium	7440-47-3	E440	0.50	mg/kg	161	136	---	---	---	
cobalt	7440-48-4	E440	0.10	mg/kg	46.5	28.8	---	---	---	
copper	7440-50-8	E440	0.50	mg/kg	3290	6470	---	---	---	
iron	7439-89-6	E440	50	mg/kg	60100	54000	---	---	---	
lead	7439-92-1	E440	0.50	mg/kg	508	372	---	---	---	
lithium	7439-93-2	E440	2.0	mg/kg	17.8	13.9	---	---	---	
magnesium	7439-95-4	E440	20	mg/kg	10900	10500	---	---	---	
manganese	7439-96-5	E440	1.0	mg/kg	764	690	---	---	---	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	---	---	---	
molybdenum	7439-98-7	E440	0.10	mg/kg	27.5	19.3	---	---	---	
nickel	7440-02-0	E440	0.50	mg/kg	242	179	---	---	---	
phosphorus	7723-14-0	E440	50	mg/kg	13900	10800	---	---	---	
potassium	7440-09-7	E440	100	mg/kg	4660	4840	---	---	---	
selenium	7782-49-2	E440	0.20	mg/kg	0.41	0.33	---	---	---	
silver	7440-22-4	E440	0.10	mg/kg	4.75	5.48	---	---	---	
sodium	7440-23-5	E440	50	mg/kg	13600	13300	---	---	---	
strontium	7440-24-6	E440	0.50	mg/kg	288	260	---	---	---	
sulfur	7704-34-9	E440	1000	mg/kg	12800	11600	---	---	---	
thallium	7440-28-0	E440	0.050	mg/kg	0.051	<0.050	---	---	---	



## Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2033-A-11	BA2033-A-12	BA2033-A-2 REP 1	BA2033-A-2 REP 2	BA2033-A-2 REP 3
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020	12-Aug-2020	12-Aug-2020	
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-011	VA20B3131-012	VA20B3131-013	VA20B3131-014	VA20B3131-015	
					Result	Result	Result	Result	Result	
<b>Metals</b>										
tin	7440-31-5	E440	2.0	mg/kg	134	147	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	410	623	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	8.12	5.89	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	4.92	4.48	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	45.9	47.2	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	4600	4560	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.2	1.9	----	----	----	
<b>TCLP Metals</b>										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	11.6	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.66	8.28	7.39	7.39	7.39	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.21	6.08	5.95	6.04	6.17	
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	2.35	2.10	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.230	0.178	0.211	0.324	0.173	
calcium, TCLP	7440-70-2	E444	10	mg/L	1980	1960	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.18	0.613	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.14	0.940	----	----	----	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	----	----	----	
lead, TCLP	7439-92-1	E444	0.25	mg/L	0.43	<0.25	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	147	138	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.45	0.58	----	----	----	
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 (Matrix: Soil/Solid)					Client sample ID	BA2033-A-11	BA2033-A-12	BA2033-A-2 REP 1	BA2033-A-2 REP 2	BA2033-A-2 REP 3
Client sampling date / time					12-Aug-2020 09:00	12-Aug-2020 09:00	12-Aug-2020	12-Aug-2020	12-Aug-2020	
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-011	VA20B3131-012	VA20B3131-013	VA20B3131-014	VA20B3131-015	
TCLP Metals					Result	Result	Result	Result	Result	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	35.4	52.4	----	----	----	

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	BA2033-A-2 REP 4	BA2033-A-7 REP 1	BA2033-A-7 REP 2	BA2033-A-7 REP 3	BA2033-A-7 REP 4
Client sampling date / time					12-Aug-2020	12-Aug-2020	12-Aug-2020	12-Aug-2020	12-Aug-2020	
Analyte	CAS Number	Method	LOR	Unit	VA20B3131-016	VA20B3131-017	VA20B3131-018	VA20B3131-019	VA20B3131-020	
TCLP Metals					Result	Result	Result	Result	Result	
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	11.7	11.7	11.7	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.39	9.04	9.04	9.04	9.04	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.87	2.87	2.87	2.87	2.87	
pH, TCLP final	----	EPP444	0.010	pH units	6.17	6.10	6.05	6.14	5.98	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.200	0.195	0.202	0.200	0.182	

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

## QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: <b>VA20B3131</b>	Page	: 1 of 18
Client	: <b>Covanta Burnaby Renewable Energy, ULC</b>	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	: Weekly Bottom Ash-Suite	Date Samples Received	: 19-Aug-2020 11:05
PO	: VANCO 0000049378	Issue Date	: 08-Sep-2020 09:09
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 20		
No. of samples analysed	: 20		

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
<b>Duplicate (DUP) RPDs</b>								
Metals	VA20B3131-001	BA2033-A-1	arsenic	7440-38-2	E440	42.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B3131-001	BA2033-A-1	chromium	7440-47-3	E440	37.1 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B3131-001	BA2033-A-1	lead	7439-92-1	E440	83.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B3131-001	BA2033-A-1	lithium	7439-93-2	E440	53.5 % 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		
<b>Metals : High Silver in Soil/Solid by CRC ICPMS</b>											
LDPE bag BA2033-A-8	E440.Ag	12-Aug-2020	28-Aug-2020	180 days	16 days	✓	28-Aug-2020	163 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-1	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-10	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-11	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-12	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-2	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 days	0 days	✓	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-3	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✓	27-Aug-2020	12 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		
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-4	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-5	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-6	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-7	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-8	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Mercury in Soil/Solid by CVAAS</b>											
LDPE bag BA2033-A-9	E510	12-Aug-2020	27-Aug-2020	28 days	15 days	✔	27-Aug-2020	12 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPMS</b>											
LDPE bag BA2033-A-1	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPMS</b>											
LDPE bag BA2033-A-10	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPMS</b>											
LDPE bag BA2033-A-11	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 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		
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-12	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-2	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-3	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-4	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-5	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-6	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-7	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-8	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 days	0 days	✔	
<b>Metals : Metals in Soil/Solid by CRC ICPCS</b>											
LDPE bag BA2033-A-9	E440	12-Aug-2020	27-Aug-2020	180 days	15 days	✔	27-Aug-2020	164 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	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-1	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-10	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-11	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-12	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-2	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-3	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-4	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-5	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----	
<b>Physical Tests : Moisture Content by Gravimetry</b>										
LDPE bag BA2033-A-6	E144	12-Aug-2020	----	----	----		26-Aug-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		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
LDPE bag BA2033-A-7	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
LDPE bag BA2033-A-8	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----		
<b>Physical Tests : Moisture Content by Gravimetry</b>											
LDPE bag BA2033-A-9	E144	12-Aug-2020	----	----	----		26-Aug-2020	----	----		
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-1	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-10	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-11	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-12	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-2	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-3	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-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		
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-4	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-5	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-6	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-7	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-8	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>Physical Tests : pH by Meter (1:2 Soil:Water Extraction)</b>											
LDPE bag BA2033-A-9	E108	12-Aug-2020	27-Aug-2020	30 days	15 days	✔	28-Aug-2020	14 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
Glass vial - total (lab preserved) BA2033-A-1	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
Glass vial - total (lab preserved) BA2033-A-10	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
Glass vial - total (lab preserved) BA2033-A-11	E512	24-Aug-2020	----	----	----		27-Aug-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		
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-12	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-2	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-3	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-4	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-5	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-6	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-7	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-8	E512	24-Aug-2020	----	----	----		27-Aug-2020	0 days	0 days	✔	
<b>TCLP Metals : Mercury by CVAAS (TCLP)</b>											
<b>Glass vial - total (lab preserved)</b> BA2033-A-9	E512	24-Aug-2020	----	----	----		27-Aug-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	
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-1	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-10	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-11	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-12	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-2	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-3	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-4	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-5	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-6	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 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	
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-7	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-8	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-9	E444	24-Aug-2020	----	----	----		26-Aug-2020	192 days	14 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-2 REP 1	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-2 REP 2	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-2 REP 3	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-2 REP 4	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-7 REP 1	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
HDPE - total (lab preserved) BA2033-A-7 REP 2	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 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	
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
<b>HDPE - total (lab preserved)</b> BA2033-A-7 REP 3	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : Metals by CRC ICPMS (TCLP)</b>										
<b>HDPE - total (lab preserved)</b> BA2033-A-7 REP 4	E444	04-Sep-2020	----	----	----		06-Sep-2020	202 days	24 days	✔
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-1	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-10	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-11	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-12	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-2	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg)</b> BA2033-A-2 REP 1	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg)</b> BA2033-A-2 REP 2	EPP444	12-Aug-2020	04-Sep-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		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2033-A-2 REP 3	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2033-A-2 REP 4	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2033-A-3	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2033-A-4	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2033-A-5	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2033-A-6	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2033-A-7	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2033-A-7 REP 1	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----		
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2033-A-7 REP 2	EPP444	12-Aug-2020	04-Sep-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	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg)</b> BA2033-A-7 REP 3	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg)</b> BA2033-A-7 REP 4	EPP444	12-Aug-2020	04-Sep-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-8	EPP444	12-Aug-2020	24-Aug-2020	----	----		----	----	----	
<b>TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)</b>										
<b>Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI)</b> BA2033-A-9	EPP444	12-Aug-2020	24-Aug-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	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Mercury in Soil/Solid by CVAAS	E510	77546	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	77547	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	77549	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	77548	1	15	6.6	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	78583	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	77546	2	12	16.6	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	77547	2	12	16.6	10.0	✔
Moisture Content by Gravimetry	E144	77549	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	77548	1	15	6.6	5.0	✔
<b>Method Blanks (MB)</b>							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	78583	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	77423	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	77546	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	77422	2	22	9.0	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	77547	1	12	8.3	5.0	✔
Moisture Content by Gravimetry	E144	77549	1	12	8.3	5.0	✔
<b>Matrix Spikes (MS)</b>							
Mercury by CVAAS (TCLP)	E512	77423	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	77422	2	22	9.0	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 <sub>3</sub> 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 <sub>3</sub> 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 <sub>3</sub> 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 <sub>3</sub> 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 <sub>3</sub> 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 : **VA20B3131**

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 : Weekly Bottom Ash-Suite  
 PO : VANCO 0000049378  
 C-O-C number : ----  
 Sampler : ----  
 Site : ----  
 Quote number : Standing Offer (BC work)  
 No. of samples received : 20  
 No. of samples analysed : 20

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 : 19-Aug-2020 11:05  
 Date Analysis Commenced : 24-Aug-2020  
 Issue Date : 08-Sep-2020 09:09

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brianna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Harsha Attanayake	Laboratory Analyst	Metals, Burnaby, British Columbia
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Russell Zhang		Metals, Burnaby, British Columbia

Page : 2 of 13  
Work Order : VA20B3131  
Client : Covanta Burnaby Renewable Energy, ULC  
Project : Weekly Bottom Ash-Suite

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## 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
<b>Physical Tests (QC Lot: 77548)</b>											
VA20B3131-001	BA2033-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	11.0	0.457%	5%	----
<b>Physical Tests (QC Lot: 77549)</b>											
VA20B3131-001	BA2033-A-1	moisture	----	E144	0.25	%	19.8	20.3	2.39%	20%	----
<b>Metals (QC Lot: 77546)</b>											
VA20B3131-001	BA2033-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
<b>Metals (QC Lot: 77547)</b>											
VA20B3131-001	BA2033-A-1	aluminum	7429-90-5	E440	50	mg/kg	31700	29200	8.17%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	102	108	5.35%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	56.6	36.7	42.5%	30%	DUP-H
		barium	7440-39-3	E440	0.50	mg/kg	567	544	4.21%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.38	0.35	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	10.4	11.1	6.81%	30%	----
		boron	7440-42-8	E440	5.0	mg/kg	247	212	15.0%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	13.2	13.2	0.0860%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	122000	119000	3.10%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	229	333	37.1%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	31.6	37.3	16.6%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	2860	2920	1.97%	30%	----
		iron	7439-89-6	E440	50	mg/kg	71000	62700	12.5%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	481	1180	83.9%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	26.5	15.3	53.5%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	11900	11500	3.26%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	842	803	4.66%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	22.6	22.4	1.07%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	193	194	0.343%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	10400	10500	0.720%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4670	4850	3.68%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.51	0.33	0.18	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	3.91	3.24	18.7%	40%	----
		sodium	7440-23-5	E440	50	mg/kg	13700	14500	5.39%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	301	275	8.94%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	11500	10800	6.83%	30%	----



Sub-Matrix: **Soil/Solid**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Metals (QC Lot: 77547) - continued</b>											
VA20B3131-001	BA2033-A-1	thallium	7440-28-0	E440	0.050	mg/kg	<0.050	0.075	0.025	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	98.5	108	9.11%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	888	719	21.0%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	5.66	4.52	22.4%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	4.32	4.43	2.50%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	46.2	46.4	0.559%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3720	4600	21.1%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.3	1.2	0.1	Diff <2x LOR	----

**Qualifiers**

<i>Qualifier</i>	<i>Description</i>
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
<b>Physical Tests (QCLot: 77549)</b>						
moisture	----	E144	0.25	%	<0.25	----
<b>Metals (QCLot: 77546)</b>						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
<b>Metals (QCLot: 77547)</b>						
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
<b>Metals (QCLot: 77547) - continued</b>						
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	---
<b>Metals (QCLot: 78583)</b>						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	---
<b>TCLP Metals (QCLot: 77422)</b>						
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	---
<b>TCLP Metals (QCLot: 77423)</b>						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	---
<b>TCLP Metals (QCLot: 82393)</b>						
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	---



Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>TCLP Metals (QCLot: 82393) - continued</b>						
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	----



## 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	
<b>Physical Tests (QCLot: 77548)</b>									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
<b>Physical Tests (QCLot: 77549)</b>									
moisture	----	E144	0.25	%	50 %	99.8	90.0	110	----
<b>Metals (QCLot: 77546)</b>									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	100.0	80.0	120	----
<b>Metals (QCLot: 77547)</b>									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	104	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	101	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.8	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	98.5	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	98.9	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	102	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.8	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	103	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.6	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	97.4	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	108	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.4	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	105	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	101	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	97.2	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	105	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	95.9	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	98.7	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
<b>Metals (QCLot: 77547) - continued</b>									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	100.0	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.8	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.8	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
<b>Metals (QCLot: 78583)</b>									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	100	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  $\geq 1x$  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
<b>TCLP Metals (QCLot: 77422)</b>										
VA20B3131-001	BA2033-A-1	antimony, TCLP	7440-36-0	E444	4.7 mg/L	5 mg/L	94.2	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	5.0 mg/L	5 mg/L	99.5	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.6 mg/L	12.5 mg/L	100	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.236 mg/L	0.25 mg/L	94.4	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.79 mg/L	10 mg/L	87.9	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.248 mg/L	0.25 mg/L	99.2	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	1.28 mg/L	1.25 mg/L	103	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	2.44 mg/L	2.5 mg/L	97.5	50.0	140	----
		iron, TCLP	7439-89-6	E444	243 mg/L	250 mg/L	97.1	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	242 mg/L	250 mg/L	97.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.48 mg/L	2.5 mg/L	99.3	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.81 mg/L	5 mg/L	96.1	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.108 mg/L	0.1 mg/L	108	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.0 mg/L	5 mg/L	100	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.77 mg/L	0.75 mg/L	103	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
<b>TCLP Metals (QCLot: 77423)</b>										
VA20B3131-001	BA2033-A-1	mercury, TCLP	7439-97-6	E512	0.0010 mg/L	0.001 mg/L	98.9	50.0	140	----
<b>TCLP Metals (QCLot: 82393)</b>										
VA20B3131-013	BA2033-A-2 REP 1	antimony, TCLP	7440-36-0	E444	5.4 mg/L	5 mg/L	108	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	97.2	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.7 mg/L	12.5 mg/L	109	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.259 mg/L	0.25 mg/L	104	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.99 mg/L	10 mg/L	89.9	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.230 mg/L	0.25 mg/L	92.1	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	1.16 mg/L	1.25 mg/L	92.9	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----



Page : 11 of 13  
 Work Order : VA20B3131  
 Client : Covanta Burnaby Renewable Energy, ULC  
 Project : Weekly Bottom Ash-Suite



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>
<b>TCLP Metals (QCLot: 82393) - continued</b>										
VA20B3131-013	BA2033-A-2 REP 1	copper, TCLP	7440-50-8	E444	2.30 mg/L	2.5 mg/L	91.8	50.0	140	----
		iron, TCLP	7439-89-6	E444	235 mg/L	250 mg/L	94.0	50.0	140	----
		lead, TCLP	7439-92-1	E444	11.0 mg/L	10 mg/L	110	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	252 mg/L	250 mg/L	101	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.36 mg/L	2.5 mg/L	94.5	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.05 mg/L	5 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.108 mg/L	0.1 mg/L	108	50.0	140	----
		thallium, TCLP	7440-28-0	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	96.5	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	
<b>Metals (QCLot: 77546)</b>									
QC-77546-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	99.4	70.0	130	----
<b>Metals (QCLot: 77547)</b>									
QC-77547-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	110	70.0	130	----
QC-77547-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	109	70.0	130	----
QC-77547-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-77547-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	102	70.0	130	----
QC-77547-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	116	40.0	160	----
QC-77547-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	99.0	70.0	130	----
QC-77547-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	99.5	70.0	130	----
QC-77547-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	107	70.0	130	----
QC-77547-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	104	70.0	130	----
QC-77547-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	93.2	70.0	130	----
QC-77547-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	96.6	70.0	130	----
QC-77547-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	107	70.0	130	----
QC-77547-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	103	70.0	130	----
QC-77547-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	----
QC-77547-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	108	70.0	130	----
QC-77547-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	111	70.0	130	----
QC-77547-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	101	70.0	130	----
QC-77547-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	91.3	40.0	160	----
QC-77547-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	98.3	70.0	130	----
QC-77547-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	113	70.0	130	----
QC-77547-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	98.7	70.0	130	----
QC-77547-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----

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 Work Order : VA20B3131  
 Client : Covanta Burnaby Renewable Energy, ULC  
 Project : Weekly Bottom Ash-Suite



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
<b>Metals (QCLot: 77547) - continued</b>									
QC-77547-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	106	70.0	130	----
QC-77547-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	104	70.0	130	----

