

Bottom Ash Data

2020 Week 41

The following analytical report was sent to the Ministry of Environment and Climate Change Strategy on November 6, 2020. The data represents bottom ash composite results for week 41 of 2020 (October 4, 2020 to October 11, 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 : VA20B7881
Amendment : 1
Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : PO#46693 Weekly Bottom Ash-Suite
PO : VANCO 0000049378
C-O-C number : ---
Sampler : ---
Site : ---
Quote number : Standing Offer (BC work)
No. of samples received : 22
No. of samples analysed : 22

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 : 13-Oct-2020 10:45
Date Analysis Commenced : 16-Oct-2020
Issue Date : 06-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.

Table with 3 columns: Signatories, Position, Laboratory Department. Lists names like Brianna Allen, Dee Lee, Janice Leung, Kim Jensen, Kinny Wu, Ophelia Chiu, Robin Weeks and their respective roles and departments.



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)					BA2041-A-2 REP 1	BA2041-A-2 REP 2	BA2041-A-2 REP 3	BA2041-A-2 REP 4	BA2041-A-7 REP 1
Client sampling date / time					07-Oct-2020	07-Oct-2020	07-Oct-2020	07-Oct-2020	07-Oct-2020
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-013	VA20B7881-014	VA20B7881-015	VA20B7881-016	VA20B7881-017
					Result	Result	Result	Result	Result
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.9	11.9	11.9
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.50	9.50	9.50	9.50	9.13
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92
pH, TCLP final	----	EPP444	0.010	pH units	5.85	5.60	6.01	5.93	5.45
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.219	0.271	0.330	0.250	0.215

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)					BA2041-A-7 REP 2	BA2041-A-7 REP 3	BA2041-A-7 REP 4	----	----
Client sampling date / time					07-Oct-2020	07-Oct-2020	07-Oct-2020	----	----
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-018	VA20B7881-019	VA20B7881-020	-----	-----
					Result	Result	Result	----	----
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.9	11.9	11.9	----	----
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.13	9.13	9.13	----	----
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	----	----
pH, TCLP final	----	EPP444	0.010	pH units	5.38	5.38	5.39	----	----
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.238	0.547	1.53	----	----

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



Analytical Results

Sub-Matrix: Solid					Client sample ID				
(Matrix: Soil/Solid)					BA2041-A-1	BA2041-A-2	BA2041-A-3	BA2041-A-4	BA2041-A-5
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-001	VA20B7881-002	VA20B7881-003	VA20B7881-004	VA20B7881-005
					Result	Result	Result	Result	Result
Physical Tests									
moisture	----	E144	0.25	%	21.6	22.5	20.5	22.7	23.4
pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	10.9	10.8	10.8	10.8
Metals									
aluminum	7429-90-5	E440	50	mg/kg	32300	36200	39300	48000	36600
antimony	7440-36-0	E440	0.10	mg/kg	124	127	165	125	116
arsenic	7440-38-2	E440	0.10	mg/kg	32.2	30.1	34.3	27.5	26.0
barium	7440-39-3	E440	0.50	mg/kg	693	602	508	483	589
beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.39	0.38	0.61	0.38
bismuth	7440-69-9	E440	0.20	mg/kg	8.94	7.73	6.99	7.05	9.66
boron	7440-42-8	E440	5.0	mg/kg	171	193	141	154	171
cadmium	7440-43-9	E440	0.020	mg/kg	14.0	16.7	35.8	16.8	16.0
calcium	7440-70-2	E440	50	mg/kg	124000	120000	116000	124000	122000
chromium	7440-47-3	E440	0.50	mg/kg	174	152	146	147	147
cobalt	7440-48-4	E440	0.10	mg/kg	30.3	84.1	37.0	139	63.2
copper	7440-50-8	E440	0.50	mg/kg	4520	1850	3040	2080	24300
iron	7439-89-6	E440	50	mg/kg	86100	69400	64400	55000	68500
lead	7439-92-1	E440	0.50	mg/kg	742	1690	1860	363	393
lithium	7439-93-2	E440	2.0	mg/kg	15.7	29.3	12.9	25.7	30.0
magnesium	7439-95-4	E440	20	mg/kg	10800	11000	9910	9670	10600
manganese	7439-96-5	E440	1.0	mg/kg	1200	688	717	741	2500
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	14.9	17.3	14.2	19.7	23.8
nickel	7440-02-0	E440	0.50	mg/kg	325	157	118	69.9	309
phosphorus	7723-14-0	E440	50	mg/kg	11800	10500	9390	12700	10900
potassium	7440-09-7	E440	100	mg/kg	4870	4220	4180	4440	4670
selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.37	0.32	0.34	0.36
silver	7440-22-4	E440	0.10	mg/kg	19.8	4.17	9.12	3.90	4.32
sodium	7440-23-5	E440	50	mg/kg	12600	11800	11700	11600	12000
strontium	7440-24-6	E440	0.50	mg/kg	349	387	276	280	293
sulfur	7704-34-9	E440	1000	mg/kg	10100	9600	8700	9700	10300
thallium	7440-28-0	E440	0.050	mg/kg	0.083	0.076	0.068	0.080	0.097



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-1	BA2041-A-2	BA2041-A-3	BA2041-A-4	BA2041-A-5
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-001	VA20B7881-002	VA20B7881-003	VA20B7881-004	VA20B7881-005	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	209	123	106	112	203	
titanium	7440-32-6	E440	1.0	mg/kg	452	741	366	365	339	
tungsten	7440-33-7	E440	0.50	mg/kg	5.56	4.63	3.55	3.05	6.09	
uranium	7440-61-1	E440	0.050	mg/kg	6.63	5.57	5.17	6.27	6.30	
vanadium	7440-62-2	E440	0.20	mg/kg	60.3	52.0	48.9	55.1	56.1	
zinc	7440-66-6	E440	2.0	mg/kg	7050	8100	3910	4020	5000	
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.9	2.6	4.0	2.8	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.9	11.9	11.6	11.6	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.73	9.50	9.83	8.95	8.77	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	5.72	5.93	5.68	5.94	5.97	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.88	2.12	2.06	2.09	2.64	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.181	0.841	0.306	0.145	0.221	
calcium, TCLP	7440-70-2	E444	10	mg/L	1870	1970	1960	1950	2000	
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	0.325	1.50	2.48	0.608	2.61	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.533	0.597	0.403	<0.050	0.897	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	11.8	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	0.31	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	129	137	128	146	148	
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	0.55	0.53	0.92	0.59	0.59	
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: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-1	BA2041-A-2	BA2041-A-3	BA2041-A-4	BA2041-A-5
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-001	VA20B7881-002	VA20B7881-003	VA20B7881-004	VA20B7881-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
zinc, TCLP	7440-66-6	E444	0.50	mg/L	42.8	45.0	45.4	32.2	33.6	

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



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-6	BA2041-A-7	BA2041-A-8	BA2041-A-9	BA2041-A-10
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-006	VA20B7881-007	VA20B7881-008	VA20B7881-009	VA20B7881-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	23.5	19.8	23.4	22.9	23.4	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.8	11.0	11.0	11.1	10.8	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	30700	45000	41100	28100	30700	
antimony	7440-36-0	E440	0.10	mg/kg	121	150	144	131	109	
arsenic	7440-38-2	E440	0.10	mg/kg	29.0	33.6	32.8	28.5	23.8	
barium	7440-39-3	E440	0.50	mg/kg	582	579	639	614	612	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.37	0.37	0.40	0.36	
bismuth	7440-69-9	E440	0.20	mg/kg	7.21	7.20	6.90	7.04	13.2	
boron	7440-42-8	E440	5.0	mg/kg	147	237	202	198	164	
cadmium	7440-43-9	E440	0.020	mg/kg	14.4	11.7	12.7	32.6	14.2	
calcium	7440-70-2	E440	50	mg/kg	119000	123000	116000	116000	122000	
chromium	7440-47-3	E440	0.50	mg/kg	153	143	166	162	215	
cobalt	7440-48-4	E440	0.10	mg/kg	57.3	24.4	247	104	20.8	
copper	7440-50-8	E440	0.50	mg/kg	3140	2170	5110	2880	2640	
iron	7439-89-6	E440	50	mg/kg	61500	80200	81500	99500	75000	
lead	7439-92-1	E440	0.50	mg/kg	1110	498	502	472	3340	
lithium	7439-93-2	E440	2.0	mg/kg	13.8	17.0	16.8	13.4	14.0	
magnesium	7439-95-4	E440	20	mg/kg	11300	9900	10400	9180	11500	
manganese	7439-96-5	E440	1.0	mg/kg	652	833	861	974	815	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	0.455	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	13.8	25.5	14.9	15.9	14.8	
nickel	7440-02-0	E440	0.50	mg/kg	104	89.4	125	109	154	
phosphorus	7723-14-0	E440	50	mg/kg	10900	10900	10200	9720	11600	
potassium	7440-09-7	E440	100	mg/kg	4670	4300	4180	4660	4320	
selenium	7782-49-2	E440	0.20	mg/kg	0.35	0.36	0.39	0.30	0.32	
silver	7440-22-4	E440	0.10	mg/kg	3.44	5.70	3.36	3.86	6.74	
sodium	7440-23-5	E440	50	mg/kg	11900	11500	10800	12000	11800	
strontium	7440-24-6	E440	0.50	mg/kg	320	304	612	347	275	
sulfur	7704-34-9	E440	1000	mg/kg	9800	10400	9100	9100	9200	
thallium	7440-28-0	E440	0.050	mg/kg	0.095	0.067	0.070	0.076	0.092	



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-6	BA2041-A-7	BA2041-A-8	BA2041-A-9	BA2041-A-10
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-006	VA20B7881-007	VA20B7881-008	VA20B7881-009	VA20B7881-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	113	129	101	142	208	
titanium	7440-32-6	E440	1.0	mg/kg	262	462	532	421	518	
tungsten	7440-33-7	E440	0.50	mg/kg	3.47	3.45	4.92	5.32	5.83	
uranium	7440-61-1	E440	0.050	mg/kg	5.40	5.63	5.19	8.83	5.46	
vanadium	7440-62-2	E440	0.20	mg/kg	70.0	54.6	52.0	50.9	48.6	
zinc	7440-66-6	E440	2.0	mg/kg	5630	4050	7800	5060	3830	
zirconium	7440-67-7	E440	1.0	mg/kg	2.1	2.0	1.9	1.2	1.6	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.9	12.0	11.9	11.8	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.55	9.13	9.29	8.84	8.74	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.92	2.92	2.92	
pH, TCLP final	----	EPP444	0.010	pH units	6.02	5.74	5.53	5.61	5.68	
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	2.34	2.07	2.07	2.26	2.52	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.214	0.858	0.226	0.515	0.256	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	1940	2060	2170	2160	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.76	0.674	0.692	0.723	0.590	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.02	0.438	0.668	0.983	1.05	
iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	5.5	<5.0	<5.0	<5.0	
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	0.38	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	146	123	135	148	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	0.53	0.60	1.19	0.71	0.52	
selenium, TCLP	7782-49-2	E444	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-6	BA2041-A-7	BA2041-A-8	BA2041-A-9	BA2041-A-10
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-006	VA20B7881-007	VA20B7881-008	VA20B7881-009	VA20B7881-010	
TCLP Metals					Result	Result	Result	Result	Result	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	35.5	82.1	55.3	47.6	51.5	

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



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-11	BA2041-A-12	BA2041-A-9 Rep 1	BA2041-A-9 Rep 2	----
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-011	VA20B7881-012	VA20B7881-021	VA20B7881-022	-----	
					Result	Result	Result	Result	---	
Physical Tests										
moisture	----	E144	0.25	%	20.9	23.0	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	10.8	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31000	32200	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	110	103	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	30.0	23.4	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	511	518	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.44	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	11.2	7.14	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	179	189	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	11.2	16.2	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	111000	115000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	135	173	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	309	48.5	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	6550	1210	----	----	----	
iron	7439-89-6	E440	50	mg/kg	78800	75300	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	326	1660	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	29.3	12.6	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	8990	10700	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	791	916	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	14.1	19.0	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	86.8	121	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	9030	9610	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	3910	4260	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.31	0.34	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	4.23	3.53	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	11200	10700	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	283	284	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	8300	9500	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.068	0.079	----	----	----	



Analytical Results

Sub-Matrix: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-11	BA2041-A-12	BA2041-A-9 Rep 1	BA2041-A-9 Rep 2	----
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-011	VA20B7881-012	VA20B7881-021	VA20B7881-022	-----	
					Result	Result	Result	Result	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	133	174	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	252	290	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	2.76	3.00	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	5.02	5.31	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	47.2	48.3	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	5560	4360	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.8	2.3	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.8	11.9	11.9	11.9	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.92	8.81	8.84	8.84	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.92	2.92	2.87	2.87	----	
pH, TCLP final	----	EPP444	0.010	pH units	5.55	5.64	5.85	5.95	----	
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	2.68	2.28	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.268	0.231	0.192	0.504	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	2050	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.953	1.24	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.30	1.83	----	----	----	
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	142	152	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0100	mg/L	<0.0100	<0.0100	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.69	0.53	----	----	----	
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: Solid (Matrix: Soil/Solid)					Client sample ID	BA2041-A-11	BA2041-A-12	BA2041-A-9 Rep 1	BA2041-A-9 Rep 2	----
Client sampling date / time					07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	07-Oct-2020 09:00	----	
Analyte	CAS Number	Method	LOR	Unit	VA20B7881-011	VA20B7881-012	VA20B7881-021	VA20B7881-022	-----	
TCLP Metals					Result	Result	Result	Result	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	50.0	43.5	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA20B7881	Page	: 1 of 18
Amendment	: 1		
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	: PO#46693 Weekly Bottom Ash-Suite	Date Samples Received	: 13-Oct-2020 10:45
PO	: VANCO 0000049378	Issue Date	: 06-Nov-2020 15:17
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 22		
No. of samples analysed	: 22		

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	VA20B7881-001	BA2041-A-1	bismuth	7440-69-9	E440	31.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	chromium	7440-47-3	E440	186 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	cobalt	7440-48-4	E440	99.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	lead	7439-92-1	E440	67.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	nickel	7440-02-0	E440	150 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	silver	7440-22-4	E440	141 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	titanium	7440-32-6	E440	57.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA20B7881-001	BA2041-A-1	vanadium	7440-62-2	E440	39.6 % 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 BA2041-A-1	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-10	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-11	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-12	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-2	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-3	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 days	✓	✓
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-4	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✓	19-Oct-2020	18 days	2 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 BA2041-A-5	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✔	19-Oct-2020	18 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-6	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✔	19-Oct-2020	18 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-7	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✔	19-Oct-2020	18 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-8	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✔	19-Oct-2020	18 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2041-A-9	E510	07-Oct-2020	17-Oct-2020	28 days	9 days	✔	19-Oct-2020	18 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2041-A-1	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2041-A-10	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2041-A-11	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2041-A-12	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 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 BA2041-A-2	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-3	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-4	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-5	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-6	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-7	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-8	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2041-A-9	E440	07-Oct-2020	17-Oct-2020	180 days	9 days	✔	19-Oct-2020	170 days	2 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2041-A-1	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-10	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-11	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-12	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-2	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-3	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-4	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-5	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-6	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2041-A-7	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2041-A-8	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2041-A-9	E144	07-Oct-2020	----	----	----		16-Oct-2020	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-1	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-10	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-11	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-12	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-2	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-3	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-4	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 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 BA2041-A-5	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-6	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-7	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-8	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2041-A-9	E108	07-Oct-2020	17-Oct-2020	30 days	9 days	✔	19-Oct-2020	20 days	2 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-1	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-10	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-11	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-12	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 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) BA2041-A-2	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-3	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-4	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-5	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-6	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-7	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-8	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2041-A-9	E512	20-Oct-2020	----	----	----		22-Oct-2020	41 days	15 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2041-A-1	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-10	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-11	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-12	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-2	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-3	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-4	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-5	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-6	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-7	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-8	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2041-A-9	E444	20-Oct-2020	----	----	----		22-Oct-2020	193 days	15 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-2 REP 1	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-2 REP 2	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-2 REP 3	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-2 REP 4	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-7 REP 1	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-7 REP 2	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE total (nitric acid) BA2041-A-7 REP 3	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 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) BA2041-A-7 REP 4	E444	23-Oct-2020	----	----	----		25-Oct-2020	196 days	18 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE (lab preserved) BA2041-A-9 Rep 1	E444	05-Nov-2020	----	----	----		06-Nov-2020	209 days	30 days	✓	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE (lab preserved) BA2041-A-9 Rep 2	E444	05-Nov-2020	----	----	----		06-Nov-2020	209 days	30 days	✓	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-1	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-10	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-11	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-12	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-2	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-2 REP 1	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----		



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-2 REP 2	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-2 REP 3	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-2 REP 4	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-3	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-4	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-5	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-6	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-7	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-7 REP 1	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-7 REP 2	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-7 REP 3	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-7 REP 4	EPP444	07-Oct-2020	23-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-8	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-9	EPP444	07-Oct-2020	20-Oct-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-9 Rep 1	EPP444	07-Oct-2020	05-Nov-2020	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2041-A-9 Rep 2	EPP444	07-Oct-2020	05-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	103667	1	19	5.2	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	103668	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	103670	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	103669	1	19	5.2	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	103667	2	19	10.5	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	103668	2	19	10.5	10.0	✔
Moisture Content by Gravimetry	E144	103670	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	103669	1	19	5.2	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	106488	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	103667	1	19	5.2	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	114082	3	22	13.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	103668	1	19	5.2	5.0	✔
Moisture Content by Gravimetry	E144	103670	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	106488	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	114082	3	22	13.6	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.

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Client : Covanta Burnaby Renewable Energy, ULC
Project : PO#46693 Weekly Bottom Ash-Suite



<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 : VA20B7881
Amendment : 1

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Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : PO#46693 Weekly Bottom Ash-Suite
PO : VANCO 0000049378
C-O-C number : ---
Sampler : ---
Site : ---
Quote number : Standing Offer (BC work)
No. of samples received : 22
No. of samples analysed : 22

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 : 13-Oct-2020 10:45
Date Analysis Commenced : 16-Oct-2020
Issue Date : 06-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. Lists names like Brianna Allen, Dee Lee, Janice Leung, Kim Jensen, Kinny Wu, Ophelia Chiu, Robin Weeks and their respective roles and departments.

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Work Order : VA20B7881 Amendment 1
Client : Covanta Burnaby Renewable Energy, ULC
Project : PO#46693 Weekly Bottom Ash-Suite



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

= Indicates a QC result that did not meet the ALS DQO.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test specific).

Sub-Matrix: Soil/Solid

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 103669)											
VA20B7881-001	BA2041-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.9	10.9	0.183%	5%	----
Physical Tests (QC Lot: 103670)											
VA20B7881-001	BA2041-A-1	moisture	----	E144	0.25	%	21.6	20.3	6.15%	20%	----
Metals (QC Lot: 103667)											
VA20B7881-001	BA2041-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 103668)											
VA20B7881-001	BA2041-A-1	aluminum	7429-90-5	E440	50	mg/kg	32300	34200	5.80%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	124	141	13.1%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	32.2	30.0	7.15%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	693	667	3.87%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.41	0.38	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	8.94	12.3	31.8%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	171	156	9.62%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	14.0	15.1	7.85%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	124000	121000	2.63%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	174	4910	186%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	30.3	90.2	99.5%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	4520	3490	25.5%	30%	----
		iron	7439-89-6	E440	50	mg/kg	86100	94400	9.26%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	742	1500	67.9%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	15.7	14.3	9.21%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	10800	10900	1.06%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1200	1160	3.00%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	14.9	16.6	11.1%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	325	2270	150%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	11800	10900	7.20%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4870	4790	1.80%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.43	0.38	0.06	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	19.8	3.46	141%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	12600	12100	3.71%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	349	309	12.3%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	10100	11200	10.0%	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: 103668) - continued											
VA20B7881-001	BA2041-A-1	thallium	7440-28-0	E440	0.050	mg/kg	0.083	0.078	0.004	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	209	199	5.11%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	452	815	57.3%	40%	DUP-H
		tungsten	7440-33-7	E440	0.50	mg/kg	5.56	5.24	5.89%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	6.63	6.03	9.57%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	60.3	90.0	39.6%	30%	DUP-H
		zinc	7440-66-6	E440	2.0	mg/kg	7050	6970	1.16%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	1.4	2.3	1.0	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: 103670)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 103667)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 103668)						
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: 103668) - 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: 106481)						
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: 106488)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	---
TCLP Metals (QCLot: 107866)						
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

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
TCLP Metals (QCLot: 107866) - 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	----
TCLP Metals (QCLot: 114082)						
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	----



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: 103669)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.7	95.0	105	----
Physical Tests (QCLot: 103670)									
moisture	----	E144	0.25	%	50 %	99.9	90.0	110	----
Metals (QCLot: 103667)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	100	80.0	120	----
Metals (QCLot: 103668)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	102	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	106	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	96.7	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	94.6	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	100	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	99.4	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	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	106	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	101	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	92.5	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	103	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	99.8	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	96.6	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	108	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	100	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	98.5	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	98.6	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	99.7	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	103	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	96.2	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: 103668) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.5	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	100	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	104	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	101	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	101	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	102	80.0	120	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1 \times$ spike level.

Sub-Matrix: Soil/Solid

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 106481)										
VA20B7881-001	BA2041-A-1	antimony, TCLP	7440-36-0	E444	4.7 mg/L	5 mg/L	94.5	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	95.6	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.5 mg/L	12.5 mg/L	100	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.244 mg/L	0.25 mg/L	97.5	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.56 mg/L	10 mg/L	95.6	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.238 mg/L	0.25 mg/L	95.0	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	1.19 mg/L	1.25 mg/L	95.6	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	2.29 mg/L	2.5 mg/L	91.7	50.0	140	----
		iron, TCLP	7439-89-6	E444	236 mg/L	250 mg/L	94.2	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	232 mg/L	250 mg/L	93.0	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.27 mg/L	2.5 mg/L	90.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.81 mg/L	5 mg/L	96.2	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	99.1	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.74 mg/L	0.75 mg/L	98.3	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
TCLP Metals (QCLot: 106488)										
VA20B7881-001	BA2041-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	87.4	50.0	140	----
TCLP Metals (QCLot: 107866)										
VA20B7881-013	BA2041-A-2 REP 1	antimony, TCLP	7440-36-0	E444	5.0 mg/L	5 mg/L	99.1	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.7 mg/L	5 mg/L	94.7	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.3 mg/L	12.5 mg/L	98.5	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.226 mg/L	0.25 mg/L	90.5	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.04 mg/L	10 mg/L	90.4	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.246 mg/L	0.25 mg/L	98.5	50.0	140	----
		calcium, TCLP	7440-70-2	E444	ND mg/L	250 mg/L	ND	50.0	140	----
		chromium, TCLP	7440-47-3	E444	1.18 mg/L	1.25 mg/L	94.7	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----



Sub-Matrix: Soil/Solid

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 107866) - continued										
VA20B7881-013	BA2041-A-2 REP 1	copper, TCLP	7440-50-8	E444	2.28 mg/L	2.5 mg/L	91.1	50.0	140	----
		iron, TCLP	7439-89-6	E444	230 mg/L	250 mg/L	91.9	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.84 mg/L	10 mg/L	98.4	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	233 mg/L	250 mg/L	93.3	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.32 mg/L	2.5 mg/L	92.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.77 mg/L	5 mg/L	95.3	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.110 mg/L	0.1 mg/L	110	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.9 mg/L	5 mg/L	97.7	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.73 mg/L	0.75 mg/L	96.9	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
TCLP Metals (QCLot: 114082)										
VA20B7881-021	BA2041-A-9 Rep 1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	95.8	50.0	140	----
		barium, TCLP	7440-39-3	E444	12.6 mg/L	12.5 mg/L	101	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.230 mg/L	0.25 mg/L	91.9	50.0	140	----
		boron, TCLP	7440-42-8	E444	8.95 mg/L	10 mg/L	89.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.255 mg/L	0.25 mg/L	102	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	1.19 mg/L	1.25 mg/L	95.2	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	2.34 mg/L	2.5 mg/L	93.4	50.0	140	----
		iron, TCLP	7439-89-6	E444	241 mg/L	250 mg/L	96.3	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.70 mg/L	10 mg/L	97.0	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	237 mg/L	250 mg/L	94.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.36 mg/L	2.5 mg/L	94.3	50.0	140	----
		selenium, TCLP	7782-49-2	E444	4.83 mg/L	5 mg/L	96.7	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.113 mg/L	0.1 mg/L	113	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.6 mg/L	5 mg/L	92.0	50.0	140	----
		vanadium, TCLP	7440-62-2	E444	0.75 mg/L	0.75 mg/L	99.5	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	
Metals (QCLot: 103667)									
QC-103667-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	102	70.0	130	----
Metals (QCLot: 103668)									
QC-103668-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	116	70.0	130	----
QC-103668-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	103	70.0	130	----
QC-103668-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	103	70.0	130	----
QC-103668-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	103	70.0	130	----
QC-103668-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	116	40.0	160	----
QC-103668-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	102	70.0	130	----
QC-103668-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	103	70.0	130	----
QC-103668-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
QC-103668-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	101	70.0	130	----
QC-103668-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	101	70.0	130	----
QC-103668-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-103668-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	126	70.0	130	----
QC-103668-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	96.9	70.0	130	----
QC-103668-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	103	70.0	130	----
QC-103668-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	107	70.0	130	----
QC-103668-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	104	70.0	130	----
QC-103668-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-103668-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	105	70.0	130	----
QC-103668-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	112	70.0	130	----
QC-103668-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----
QC-103668-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	97.1	70.0	130	----
QC-103668-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	95.6	40.0	160	----
QC-103668-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	125	70.0	130	----
QC-103668-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	119	70.0	130	----
QC-103668-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	99.0	70.0	130	----
QC-103668-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----
QC-103668-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	97.6	70.0	130	----

Page : 13 of 13
 Work Order : VA20B7881 Amendment 1
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : PO#46693 Weekly Bottom Ash-Suite



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 103668) - continued									
QC-103668-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	103	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

Report To		Report Format / Distribution		Service Requested (Rush for routine analysis subject to availability)	
Company:	Covanta Energy	<input type="checkbox"/> Standard	<input type="checkbox"/> Other	<input checked="" type="radio"/> Regular (Standard Turnaround Times - Business Days)	
Contact:	Steve Mckinney / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive	Email 1: ismckinney@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT	
	Burnaby BC	Email 2: rjohnson4@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT	
Phone:	604-521-1025	Email 3: idskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT	

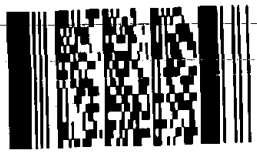
<input type="checkbox"/> Yes <input type="checkbox"/> No		Analysis Request	
		brent.kirkpatrick@metrovancover.org Sarah.Wellman@metrovancover.org	

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:							
---------------------------------	--	--------------	--	----------	--	--	--	--	--	--	--

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR-FULL-VA (all metals)	Number of Containers
1	BA2041-A-1	07-Oct-20	9:00	Soil	X	X		X	1
2	BA2041-A-2	07-Oct-20	9:00	Soil	X	X		X	1
3	BA2041-A-3	07-Oct-20	9:00	Soil	X	X		X	1
4	BA2041-A-4	07-Oct-20	9:00	Soil	X	X		X	1
5	BA2041-A-5	07-Oct-20	9:00	Soil	X	X		X	1
6	BA2041-A-6	07-Oct-20	9:00	Soil	X	X		X	1
7	BA2041-A-7	07-Oct-20	9:00	Soil	X	X		X	1
8	BA2041-A-8	07-Oct-20	9:00	Soil	X	X		X	1
9	BA2041-A-9	07-Oct-20	9:00	Soil	X	X		X	1
10	BA2041-A-10	07-Oct-20	9:00	Soil	X	X		X	1
11	BA2041-A-11	07-Oct-20	9:00	Soil	X	X		X	1
12	BA2041-A-12	07-Oct-20	9:00	Soil	X	X		X	1

Environmental Division
Vancouver
Work Order Reference
VA20B7881



Telephone : +1 604 253 4188

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
<i>[Signature]</i>	13-Oct-20	0900	<i>[Signature]</i>	13/10/20	10:45am	20.9 °C				