

Bottom Ash Data

2021 Week 47

The following analytical report represents bottom ash composite results for week 47 of 2021 (November 14, 2021 to November 20, 2021).

The bottom ash meets the conditions of Metro Vancouver's 2020 Bottom Ash Management Plan and is suitable for disposal.



CERTIFICATE OF ANALYSIS

Work Order : **VA21C6044**
Client : **Covanta Burnaby Renewable Energy, ULC**
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000050390
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 11
Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 23-Nov-2021 10:25
Date Analysis Commenced : 25-Nov-2021
Issue Date : 03-Dec-2021 11:55

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>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2147-A-1	BA2147-A-2	BA2147-A-3	BA2147-A-4	BA2147-A-5
(Matrix: Soil/Solid)										
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-001	VA21C6044-002	VA21C6044-003	VA21C6044-004	VA21C6044-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	26.2	25.4	27.4	23.6	26.2	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.5	10.5	10.4	10.4	10.6	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	58700	38100	42500	45500	45600	
antimony	7440-36-0	E440	0.10	mg/kg	81.9	87.5	96.0	79.9	97.2	
arsenic	7440-38-2	E440	0.10	mg/kg	16.0	17.6	17.3	17.7	17.6	
barium	7440-39-3	E440	0.50	mg/kg	619	610	859	710	719	
beryllium	7440-41-7	E440	0.10	mg/kg	0.39	0.51	0.46	0.39	0.40	
bismuth	7440-69-9	E440	0.20	mg/kg	6.07	11.2	8.25	5.25	6.18	
boron	7440-42-8	E440	5.0	mg/kg	164	288	352	279	261	
cadmium	7440-43-9	E440	0.020	mg/kg	8.88	8.49	12.6	9.68	8.27	
calcium	7440-70-2	E440	50	mg/kg	142000	137000	147000	135000	142000	
chromium	7440-47-3	E440	0.50	mg/kg	145	821	317	127	184	
cobalt	7440-48-4	E440	0.10	mg/kg	85.7	46.5	59.8	28.5	318	
copper	7440-50-8	E440	0.50	mg/kg	2010	1940	5290	3460	2900	
iron	7439-89-6	E440	50	mg/kg	63900	42100	91700	51400	66500	
lead	7439-92-1	E440	0.50	mg/kg	712	1040	546	595	478	
lithium	7439-93-2	E440	2.0	mg/kg	27.9	22.9	27.2	24.0	44.0	
magnesium	7439-95-4	E440	20	mg/kg	12500	13200	14200	11300	15400	
manganese	7439-96-5	E440	1.0	mg/kg	952	1150	983	1220	879	
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	17.5	28.9	34.1	16.0	19.1	
nickel	7440-02-0	E440	0.50	mg/kg	152	652	243	97.6	102	
phosphorus	7723-14-0	E440	50	mg/kg	10700	11800	10600	11500	13200	
potassium	7440-09-7	E440	100	mg/kg	4270	4280	4680	4580	4600	
selenium	7782-49-2	E440	0.20	mg/kg	0.29	0.23	0.63	0.32	0.24	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	----	----	----	3.01	
silver	7440-22-4	E440	0.10	mg/kg	6.38	13.4	6.55	7.13	----	
sodium	7440-23-5	E440	50	mg/kg	15800	15500	17200	16000	15800	
strontium	7440-24-6	E440	0.50	mg/kg	306	422	365	419	299	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-1	BA2147-A-2	BA2147-A-3	BA2147-A-4	BA2147-A-5
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-001	VA21C6044-002	VA21C6044-003	VA21C6044-004	VA21C6044-005	
					Result	Result	Result	Result	Result	
Metals										
sulfur	7704-34-9	E440	1000	mg/kg	10100	9000	8900	9400	10000	
thallium	7440-28-0	E440	0.050	mg/kg	0.066	0.062	0.079	0.068	0.101	
tin	7440-31-5	E440	2.0	mg/kg	657	361	115	147	101	
titanium	7440-32-6	E440	1.0	mg/kg	976	724	922	927	664	
tungsten	7440-33-7	E440	0.50	mg/kg	5.16	7.74	9.57	7.86	6.46	
uranium	7440-61-1	E440	0.050	mg/kg	5.26	4.92	5.24	5.18	4.98	
vanadium	7440-62-2	E440	0.20	mg/kg	120	72.9	77.6	95.8	247	
zinc	7440-66-6	E440	2.0	mg/kg	7160	3750	5440	3490	4870	
zirconium	7440-67-7	E440	1.0	mg/kg	4.2	2.7	1.8	2.0	2.4	
TCLP Metals										
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	9.04	9.15	8.91	9.06	9.18	
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	6.09	6.09	6.08	6.36	6.32	
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	1.96	1.68	1.58	1.74	1.56	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.180	0.132	0.204	0.255	0.124	
calcium, TCLP	7440-70-2	E444	10	mg/L	2200	2090	1960	1980	1970	
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	1.30	0.800	1.06	0.739	1.45	
copper, TCLP	7440-50-8	E444	0.050	mg/L	1.64	1.37	1.29	0.733	1.00	
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	141	139	133	131	127	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.66	0.42	0.48	0.49	0.40	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-1	BA2147-A-2	BA2147-A-3	BA2147-A-4	BA2147-A-5
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-001	VA21C6044-002	VA21C6044-003	VA21C6044-004	VA21C6044-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	0.16	<0.15	<0.15	<0.15	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	52.3	44.0	51.6	29.6	40.5	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	

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



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-6	BA2147-A-7	BA2147-A-8	BA2147-A-9	BA2147-A-10
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-006	VA21C6044-007	VA21C6044-008	VA21C6044-009	VA21C6044-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	24.5	24.9	26.4	25.2	23.0	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.5	10.4	10.3	10.7	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	47700	55300	41900	41800	39600	
antimony	7440-36-0	E440	0.10	mg/kg	78.1	97.5	99.6	99.3	73.0	
arsenic	7440-38-2	E440	0.10	mg/kg	16.3	17.6	27.0	16.1	11.8	
barium	7440-39-3	E440	0.50	mg/kg	696	740	681	797	757	
beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.42	0.42	0.44	0.37	
bismuth	7440-69-9	E440	0.20	mg/kg	4.64	7.12	6.37	4.98	11.6	
boron	7440-42-8	E440	5.0	mg/kg	224	209	280	224	174	
cadmium	7440-43-9	E440	0.020	mg/kg	7.68	8.18	13.5	10.1	6.46	
calcium	7440-70-2	E440	50	mg/kg	136000	143000	153000	160000	139000	
chromium	7440-47-3	E440	0.50	mg/kg	590	178	416	166	125	
cobalt	7440-48-4	E440	0.10	mg/kg	64.9	331	51.0	474	30.1	
copper	7440-50-8	E440	0.50	mg/kg	1250	5010	4040	3180	4640	
iron	7439-89-6	E440	50	mg/kg	57400	75500	72200	78600	59500	
lead	7439-92-1	E440	0.50	mg/kg	533	965	591	644	430	
lithium	7439-93-2	E440	2.0	mg/kg	28.4	31.6	25.9	31.0	21.0	
magnesium	7439-95-4	E440	20	mg/kg	12800	15100	13000	16200	13000	
manganese	7439-96-5	E440	1.0	mg/kg	967	1140	1090	946	766	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	
molybdenum	7439-98-7	E440	0.10	mg/kg	22.8	21.9	24.8	22.2	22.1	
nickel	7440-02-0	E440	0.50	mg/kg	278	187	329	154	2580	
phosphorus	7723-14-0	E440	50	mg/kg	11700	13000	12400	13800	11800	
potassium	7440-09-7	E440	100	mg/kg	4410	4600	4590	5000	4090	
selenium	7782-49-2	E440	0.20	mg/kg	0.28	0.33	0.30	0.32	0.27	
silver	7440-22-4	E440.Ag	0.10	mg/kg	----	7.91	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	2.70	----	10.6	11.8	4.34	
sodium	7440-23-5	E440	50	mg/kg	15000	16700	15000	16700	14400	
strontium	7440-24-6	E440	0.50	mg/kg	318	443	369	357	332	
sulfur	7704-34-9	E440	1000	mg/kg	8500	9900	11100	10400	8700	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-6	BA2147-A-7	BA2147-A-8	BA2147-A-9	BA2147-A-10
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-006	VA21C6044-007	VA21C6044-008	VA21C6044-009	VA21C6044-010	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.074	0.065	0.070	0.074	0.066	
tin	7440-31-5	E440	2.0	mg/kg	84.5	139	168	138	130	
titanium	7440-32-6	E440	1.0	mg/kg	1200	779	459	726	334	
tungsten	7440-33-7	E440	0.50	mg/kg	6.07	8.17	11.6	8.76	24.4	
uranium	7440-61-1	E440	0.050	mg/kg	4.56	5.05	5.65	5.42	4.10	
vanadium	7440-62-2	E440	0.20	mg/kg	78.6	142	135	102	91.0	
zinc	7440-66-6	E440	2.0	mg/kg	3350	3420	4830	3600	3070	
zirconium	7440-67-7	E440	1.0	mg/kg	2.8	3.2	2.8	1.9	2.6	
TCLP Metals										
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	8.93	9.14	9.18	9.29	9.52	
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	6.25	6.35	6.33	6.25	6.08	
antimony, TCLP	7440-36-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	
boron, TCLP	7440-42-8	E444	0.50	mg/L	1.68	1.60	1.60	1.63	1.55	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.135	0.102	0.096	0.118	0.120	
calcium, TCLP	7440-70-2	E444	10	mg/L	1950	1950	1920	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	0.998	1.13	1.00	0.963	0.669	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.888	0.644	0.804	1.04	0.834	
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	0.39	0.26	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	122	125	131	124	134	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.43	0.35	0.45	0.58	0.64	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-6	BA2147-A-7	BA2147-A-8	BA2147-A-9	BA2147-A-10
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00	17-Nov-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-006	VA21C6044-007	VA21C6044-008	VA21C6044-009	VA21C6044-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	0.20	<0.15	0.18	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	29.6	25.7	29.1	32.0	66.2	66.2
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	<10	<10	<10	<10

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2147-A-11	BA2147-A-12	----	----	----
(Matrix: Soil/Solid)					Client sampling date / time	17-Nov-2021 09:00	17-Nov-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-011	VA21C6044-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	27.5	26.3	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	10.6	10.6	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	33900	35500	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	111	82.8	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	15.2	26.8	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	678	698	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.36	0.36	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	7.57	7.77	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	209	194	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	20.9	7.49	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	131000	139000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	122	128	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	26.8	96.6	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	9510	1240	----	----	----	
iron	7439-89-6	E440	50	mg/kg	77700	54500	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	12200	516	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	63.1	24.2	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	12600	13200	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	759	671	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	0.548	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	16.0	20.1	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	117	178	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	11000	11000	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	3740	4230	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.22	0.24	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	3.66	4.05	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	13500	14300	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	284	351	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	8200	9200	----	----	----	
thallium	7440-28-0	E440	0.050	mg/kg	0.059	0.061	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-11	BA2147-A-12	----	----	----
Client sampling date / time					17-Nov-2021 09:00	17-Nov-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-011	VA21C6044-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	132	80.9	---	---	---	
titanium	7440-32-6	E440	1.0	mg/kg	361	557	---	---	---	
tungsten	7440-33-7	E440	0.50	mg/kg	4.43	5.32	---	---	---	
uranium	7440-61-1	E440	0.050	mg/kg	3.89	4.73	---	---	---	
vanadium	7440-62-2	E440	0.20	mg/kg	74.8	75.7	---	---	---	
zinc	7440-66-6	E440	2.0	mg/kg	6840	4170	---	---	---	
zirconium	7440-67-7	E440	1.0	mg/kg	1.7	1.7	---	---	---	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.6	---	---	---	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	9.31	9.27	---	---	---	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.89	2.89	---	---	---	
pH, TCLP final	----	EPP444	0.010	pH units	6.10	6.08	---	---	---	
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	1.82	2.13	---	---	---	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.134	0.161	---	---	---	
calcium, TCLP	7440-70-2	E444	10	mg/L	2030	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	1.53	0.775	---	---	---	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.934	0.616	---	---	---	
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	1.20	---	---	---	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	133	125	---	---	---	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.67	0.48	---	---	---	
selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	---	---	---	
silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	---	---	---	
thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	---	---	---	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	---	---	---	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2147-A-11	BA2147-A-12	----	----	----
					Client sampling date / time	17-Nov-2021 09:00	17-Nov-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C6044-011	VA21C6044-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	38.0	71.1	----	----	----	
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA21C6044	Page	: 1 of 16
Client	: Covanta Burnaby Renewable Energy, ULC	Laboratory	: Vancouver - Environmental
Contact	: Steve McKinney	Account Manager	: Brent Mack
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 604 521 1025	Telephone	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 23-Nov-2021 10:25
PO	: VANCO 0000050390	Issue Date	: 03-Dec-2021 11:55
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) 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	VA21C6044-010	BA2147-A-10	bismuth	7440-69-9	E440	96.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	chromium	7440-47-3	E440	88.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	cobalt	7440-48-4	E440	100 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	copper	7440-50-8	E440	124 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	lead	7439-92-1	E440	41.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	lithium	7439-93-2	E440	45.8 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	manganese	7439-96-5	E440	75.5 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	nickel	7440-02-0	E440	173 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	silver	7440-22-4	E440	129 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	tungsten	7440-33-7	E440	89.2 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21C6044-010	BA2147-A-10	zinc	7440-66-6	E440	34.4 % 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.

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-3527350 02	----	antimony	7440-36-0	E440	121 % MES	80.0-120%	Recovery greater than upper control limit
Metals	QC-MRG2-3527350 02	----	phosphorus	7723-14-0	E440	124 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Page : 3 of 16
Work Order : VA21C6044
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
---------------	----------------------	----------------------	---------	------------	--------	--------	--------	---------



Analysis Holding Time Compliance

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

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

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

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2147-A-5	E440.Ag	17-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	----	15 days		
Metals : High Silver in Soil/Solid by CRC ICPMS											
LDPE bag BA2147-A-7	E440.Ag	17-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	----	15 days		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-1	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-2	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-3	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-4	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✓	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-5	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✓	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-6	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-7	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-8	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-9	E510	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	28 days	13 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-10	E510	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-11	E510	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	28 days	15 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2147-A-12	E510	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	28 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2147-A-1	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2147-A-2	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 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							
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-3	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-4	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-5	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-6	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-7	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-8	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-9	E440	17-Nov-2021	27-Nov-2021	----	----		30-Nov-2021	180 days	14 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-10	E440	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	180 days	15 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2147-A-11	E440	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	180 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		
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2147-A-12	E440	17-Nov-2021	30-Nov-2021	----	----		02-Dec-2021	180 days	15 days	✔	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-1	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-10	E144	17-Nov-2021	----	----	----		30-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-11	E144	17-Nov-2021	----	----	----		30-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-12	E144	17-Nov-2021	----	----	----		30-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-2	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-3	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-4	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-5	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-6	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-7	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-8	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2147-A-9	E144	17-Nov-2021	----	----	----		25-Nov-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-1	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-2	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-3	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-4	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-5	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-6	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-7	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-8	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-9	E108	17-Nov-2021	27-Nov-2021	----	----		28-Nov-2021	30 days	11 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-10	E108	17-Nov-2021	30-Nov-2021	----	----		30-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-11	E108	17-Nov-2021	30-Nov-2021	----	----		30-Nov-2021	30 days	13 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2147-A-12	E108	17-Nov-2021	30-Nov-2021	----	----		30-Nov-2021	30 days	13 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2147-A-1	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days		
TCLP Metals : Mercury by CVAAS (TCLP)											
HDPE - total (lab preserved) BA2147-A-10	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days		



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		
				Rec	Actual			Rec	Actual	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-11	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-12	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-2	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-3	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-4	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-5	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-6	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-7	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-8	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval
TCLP Metals : Mercury by CVAAS (TCLP)										
HDPE - total (lab preserved) BA2147-A-9	E512	28-Nov-2021	----	----	----		30-Nov-2021	----	13 days	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-1	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-10	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-11	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-12	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-2	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-3	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-4	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-5	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-6	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-7	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-8	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2147-A-9	E444	28-Nov-2021	----	----	----		30-Nov-2021	180 days	13 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-1	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-10	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-11	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-12	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-2	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----	



Matrix: **Soil/Solid**

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-3	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-4	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-5	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-6	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-7	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-8	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 180 Day HT (e.g. metals ex. Hg) BA2147-A-9	EPP444	17-Nov-2021	28-Nov-2021	----	----		----	----	----		

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Mercury in Soil/Solid by CVAAS	E510	355563	2	21	9.5	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	352735	2	32	6.2	5.0	✔
Moisture Content by Gravimetry	E144	355567	2	25	8.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	355564	2	21	9.5	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	356977	1	2	50.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	355563	4	21	19.0	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	352735	4	32	12.5	10.0	✔
Moisture Content by Gravimetry	E144	355567	2	25	8.0	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	355564	2	21	9.5	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	356977	1	2	50.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	355920	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	355563	2	21	9.5	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	355921	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	352735	2	32	6.2	5.0	✔
Moisture Content by Gravimetry	E144	355567	2	25	8.0	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	355920	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	355921	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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



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



QUALITY CONTROL REPORT

Work Order : VA21C6044

Page : 1 of 15

Client : Covanta Burnaby Renewable Energy, ULC
Contact : Steve McKinney
Address : 5150 Riverbend Drive
Burnaby BC Canada V3N 4V3
Telephone : 604 521 1025
Project : Weekly Bottom Ash - Suite
PO : VANCO 0000050390
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : Standing Offer (BC work)
No. of samples received : 12
No. of samples analysed : 12

Laboratory : Vancouver - Environmental
Account Manager : Brent Mack
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : 778-370-3279
Date Samples Received : 23-Nov-2021 10:25
Date Analysis Commenced : 25-Nov-2021
Issue Date : 03-Dec-2021 11:55

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

This Quality Control Report contains the following information:

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

Signatories

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

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Caleb Deroche (Lab Analyst, Metals), Dee Lee (Analyst, Metals), Kevin Duarte (Supervisor - Metals ICP Instrumentation, Metals), Kim Jensen (Department Manager - Metals, Metals), and Rebecca Sit (Supervisor - Organics Extractions, Organics).

Page : 2 of 15
Work Order : VA21C6044
Client : Covanta Burnaby Renewable Energy, ULC
Project : Weekly Bottom Ash - Suite



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percentage Difference

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 352737)											
VA21C6044-001	BA2147-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	10.5	10.4	1.1%	5%	----
Physical Tests (QC Lot: 352738)											
VA21C6044-001	BA2147-A-1	moisture	----	E144	0.25	%	26.2	24.5	6.48%	20%	----
Physical Tests (QC Lot: 355564)											
VA21C6044-010	BA2147-A-10	pH (1:2 soil:water)	----	E108	0.10	pH units	10.7	10.7	0.1%	5%	----
Physical Tests (QC Lot: 355567)											
VA21C6044-010	BA2147-A-10	moisture	----	E144	0.25	%	23.0	26.0	12.2%	20%	----
Metals (QC Lot: 352735)											
VA21C5839-042	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	41800	42100	0.736%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.24	0.23	0.007	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	5.18	5.00	3.58%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	30.2	29.2	3.49%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.32	0.28	0.04	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.108	0.111	0.004	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	5490	6030	9.37%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	55.6	62.2	11.2%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	13.0	16.1	21.4%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	76.2	71.4	6.52%	30%	----
		iron	7439-89-6	E440	50	mg/kg	47700	51500	7.64%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	6.11	5.81	5.05%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	7.2	7.8	0.6	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	9670	12400	24.8%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	661	686	3.71%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.76	0.73	4.34%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	25.1	29.5	16.0%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	714	676	5.39%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	210	190	20	Diff <2x LOR	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.94	0.82	0.12	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	0.18	0.16	0.03	Diff <2x LOR	----



Sub-Matrix: Soil/Solid

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 352735) - continued											
VA21C5839-042	Anonymous	sodium	7440-23-5	E440	50	mg/kg	169	134	35	Diff <2x LOR	----
		strontium	7440-24-6	E440	0.50	mg/kg	26.0	31.9	20.4%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	2860	3110	8.38%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.571	0.549	3.95%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	164	182	10.7%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	48.2	53.1	9.67%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	7.6	8.1	5.71%	30%	----
Metals (QC Lot: 352736)											
VA21C6044-001	BA2147-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 355562)											
VA21C6044-010	BA2147-A-10	aluminum	7429-90-5	E440	50	mg/kg	39600	48000	19.1%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	73.0	87.8	18.4%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	11.8	13.6	13.5%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	757	704	7.18%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.37	0.36	0.007	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	11.6	4.06	96.4%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	174	207	17.0%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	6.46	6.92	6.93%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	139000	126000	9.73%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	125	324	88.8%	30%	DUP-H
		cobalt	7440-48-4	E440	0.10	mg/kg	30.1	90.4	100%	30%	DUP-H
		copper	7440-50-8	E440	0.50	mg/kg	4640	19800	124%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	59500	65300	9.30%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	430	657	41.8%	40%	DUP-H
		lithium	7439-93-2	E440	2.0	mg/kg	21.0	33.4	45.8%	30%	DUP-H
		magnesium	7439-95-4	E440	20	mg/kg	13000	11400	13.7%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	766	1700	75.5%	30%	DUP-H
		molybdenum	7439-98-7	E440	0.10	mg/kg	22.1	17.2	24.8%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	2580	183	173%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	11800	12000	1.38%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4090	3920	4.14%	40%	----



Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 355562) - continued											
VA21C6044-010	BA2147-A-10	selenium	7782-49-2	E440	0.20	mg/kg	0.27	0.27	0.0008	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	4.34	20.0	129%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	14400	13600	5.45%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	332	326	1.90%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	8700	8800	0.582%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.066	0.058	0.008	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	130	183	33.7%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	334	358	6.96%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	24.4	9.35	89.2%	30%	DUP-H
		uranium	7440-61-1	E440	0.050	mg/kg	4.10	4.02	1.94%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	91.0	94.8	4.03%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	3070	4340	34.4%	30%	DUP-H
		zirconium	7440-67-7	E440	1.0	mg/kg	2.6	2.8	0.2	Diff <2x LOR	----
Metals (QC Lot: 355563)											
VA21C6044-010	BA2147-A-10	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	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: 352738)						
moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 355567)						
moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 352735)						
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: 352735) - continued						
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 352736)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 355562)						
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 355562) - continued						
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Metals (QCLot: 355563)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 356977)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 355920)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 355921)						
antimony, TCLP	7440-36-0	E444	1	mg/L	<1.0	----
arsenic, TCLP	7440-38-2	E444	1	mg/L	<1.0	----
barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	----
beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	----
boron, TCLP	7440-42-8	E444	0.5	mg/L	<0.50	----
cadmium, TCLP	7440-43-9	E444	0.05	mg/L	<0.050	----
calcium, TCLP	7440-70-2	E444	10	mg/L	<10	----
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	----
cobalt, TCLP	7440-48-4	E444	0.05	mg/L	<0.050	----
copper, TCLP	7440-50-8	E444	0.05	mg/L	<0.050	----
iron, TCLP	7439-89-6	E444	5	mg/L	<5.0	----
lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	----
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	<2.5	----
nickel, TCLP	7440-02-0	E444	0.25	mg/L	<0.25	----
selenium, TCLP	7782-49-2	E444	0.1	mg/L	<0.10	----
silver, TCLP	7440-22-4	E444	0.05	mg/L	<0.050	----
thallium, TCLP	7440-28-0	E444	1	mg/L	<1.0	----
uranium, TCLP	7440-61-1	E444	0.2	mg/L	<0.20	----
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	----
zinc, TCLP	7440-66-6	E444	0.5	mg/L	<0.50	----
zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	----



Laboratory Control Sample (LCS) Report

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

Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Physical Tests (QCLot: 352737)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 352738)									
moisture	----	E144	0.25	%	50 %	99.7	90.0	110	----
Physical Tests (QCLot: 355564)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 355567)									
moisture	----	E144	0.25	%	50 %	100.0	90.0	110	----
Metals (QCLot: 352735)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	117	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	# 121	80.0	120	MES
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	116	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	111	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	115	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	110	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	109	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	113	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	111	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	116	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	114	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	114	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	119	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	114	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	118	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	116	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	118	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	115	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	112	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	# 124	80.0	120	MES
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	115	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	117	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	101	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	115	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	114	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: 352735) - continued									
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	116	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	114	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	114	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	109	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	112	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	114	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	118	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	118	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	107	80.0	120	----
Metals (QCLot: 352736)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	114	80.0	120	----
Metals (QCLot: 355562)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	109	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	107	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	106	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	111	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	102	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	110	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	109	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	98.5	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	109	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	102	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	109	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	105	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.6	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	110	80.0	120	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%)		Qualifier
						Low	High		
Metals (QCLot: 355562) - continued									
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	108	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	108	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	107	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	99.5	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	103	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	104	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	100	80.0	120	----
Metals (QCLot: 355563)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	110	80.0	120	----
Metals (QCLot: 356977)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	97.3	80.0	120	----

Qualifiers

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).



Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 355920)										
VA21C6044-001	BA2147-A-1	mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.1	50.0	140	----
TCLP Metals (QCLot: 355921)										
VA21C6044-001	BA2147-A-1	antimony, TCLP	7440-36-0	E444	5.1 mg/L	5 mg/L	103	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.8 mg/L	5 mg/L	96.6	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	0.238 mg/L	0.25 mg/L	95.0	50.0	140	----
		boron, TCLP	7440-42-8	E444	10.5 mg/L	10 mg/L	105	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.231 mg/L	0.25 mg/L	92.5	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	1.19 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	2.18 mg/L	2.5 mg/L	87.2	50.0	140	----
		iron, TCLP	7439-89-6	E444	234 mg/L	250 mg/L	93.7	50.0	140	----
		lead, TCLP	7439-92-1	E444	9.99 mg/L	10 mg/L	99.9	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	247 mg/L	250 mg/L	98.8	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.35 mg/L	2.5 mg/L	93.8	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.03 mg/L	5 mg/L	101	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.100 mg/L	0.1 mg/L	99.7	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	97.1	50.0	140	----
		uranium, TCLP	7440-61-1	E444	4.98 mg/L	5 mg/L	99.7	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.72 mg/L	0.75 mg/L	96.3	50.0	140	----
		zinc, TCLP	7440-66-6	E444	ND mg/L	10 mg/L	ND	50.0	140	----
		zirconium, TCLP	7440-67-7	E444	9 mg/L	10 mg/L	92.7	50.0	150	----



Reference Material (RM) Report

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

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 352735)									
QC-352735-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	105	70.0	130	----
QC-352735-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	99.2	70.0	130	----
QC-352735-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	111	70.0	130	----
QC-352735-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	95.4	70.0	130	----
QC-352735-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	107	70.0	130	----
QC-352735-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	115	40.0	160	----
QC-352735-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	93.7	70.0	130	----
QC-352735-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	108	70.0	130	----
QC-352735-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
QC-352735-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-352735-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	106	70.0	130	----
QC-352735-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	104	70.0	130	----
QC-352735-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	97.6	70.0	130	----
QC-352735-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	102	70.0	130	----
QC-352735-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	108	70.0	130	----
QC-352735-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	109	70.0	130	----
QC-352735-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	108	70.0	130	----
QC-352735-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	103	70.0	130	----
QC-352735-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	103	70.0	130	----
QC-352735-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	108	70.0	130	----
QC-352735-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	97.2	70.0	130	----
QC-352735-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	99.4	70.0	130	----
QC-352735-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	93.4	40.0	160	----
QC-352735-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	98.2	70.0	130	----
QC-352735-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	112	70.0	130	----
QC-352735-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	98.8	70.0	130	----
QC-352735-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	107	70.0	130	----
QC-352735-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-352735-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	90.6	70.0	130	----



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: 352736)									
QC-352736-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	97.4	70.0	130	----
Metals (QCLot: 355562)									
QC-355562-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	114	70.0	130	----
QC-355562-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	103	70.0	130	----
QC-355562-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	113	70.0	130	----
QC-355562-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	104	70.0	130	----
QC-355562-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	115	70.0	130	----
QC-355562-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	126	40.0	160	----
QC-355562-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	108	70.0	130	----
QC-355562-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	112	70.0	130	----
QC-355562-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	115	70.0	130	----
QC-355562-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	106	70.0	130	----
QC-355562-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	107	70.0	130	----
QC-355562-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	109	70.0	130	----
QC-355562-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	106	70.0	130	----
QC-355562-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	111	70.0	130	----
QC-355562-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	114	70.0	130	----
QC-355562-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	107	70.0	130	----
QC-355562-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	112	70.0	130	----
QC-355562-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
QC-355562-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	100	70.0	130	----
QC-355562-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	114	70.0	130	----
QC-355562-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	105	70.0	130	----
QC-355562-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	108	70.0	130	----
QC-355562-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	97.5	40.0	160	----
QC-355562-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	100	70.0	130	----
QC-355562-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	118	70.0	130	----
QC-355562-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	102	70.0	130	----
QC-355562-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	108	70.0	130	----
QC-355562-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	102	70.0	130	----
QC-355562-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	99.9	70.0	130	----
Metals (QCLot: 355563)									

Page : 15 of 15
 Work Order : VA21C6044
 Client : Covanta Burnaby Renewable Energy, ULC
 Project : Weekly Bottom Ash - Suite



Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%)		Qualifier
							Low	High	
Metals (QCLot: 355563) - continued									
QC-355563-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	101	70.0	130	----



Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page ____ of ____

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

Invoice To Same as Report? <input type="checkbox"/> Yes <input type="checkbox"/> No			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 #:			<table border="1"> <tr> <td rowspan="4">MET-TCLP-VA (all metals, Hg)</td> <td rowspan="4">MOISTURE</td> <td rowspan="4">Chrome 6</td> <td rowspan="4">MET-CSR+FULL-VA (all metals)</td> <td colspan="6"></td> <td rowspan="4">Number of Containers</td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> <tr> <td colspan="6"></td> </tr> </table>						MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)							Number of Containers																		
MET-TCLP-VA (all metals, Hg)	MOISTURE	Chrome 6	MET-CSR+FULL-VA (all metals)													Number of Containers																								
Company:			PO / AFE: PO# 46693 Weekly Bottom Ash - Suite																																					
Contact:			LSD: (includes 2:1 pH)																																					
Address:			Quote #:																																					
Phone: Fax:			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
BA2147-A-1		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-2		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-3		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-4		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-5		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-6		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-7		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-8		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-9		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-10		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-11		17-Nov-21	9:00	Soil	X	X		X							1
BA2147-A-12		17-Nov-21	9:00	Soil	X	X		X							1

Environmental Division
Vancouver
Work Order Reference
VA21C6044



Telephone : +1 604 263 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: <i>[Signature]</i>	Date (dd-mmm-yy): 22-Nov-21	Time (hh-mm): 8:00	Received by: <i>[Signature]</i>	Date: 23 Nov	Time: 10:25 am	Temperature: 22 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF	