

Bottom Ash Data

2021 Week 25

The following analytical report represents bottom ash composite results for week 25 of 2021 (June 13, 2021 to June 19, 2021).

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



CERTIFICATE OF ANALYSIS

<p>Work Order : VA21B2559</p> <p>Amendment : 1</p> <p>Client : Covanta Burnaby Renewable Energy, ULC</p> <p>Contact : Steve McKinney</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : 604 521 1025</p> <p>Project : Weekly Bottom Ash - Suite</p> <p>PO : VANCO 0000050390</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : ----</p> <p>Quote number : Standing Offer (BC work)</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 11</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Brent Mack</p> <p>Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p>Telephone : 778-370-3279</p> <p>Date Samples Received : 22-Jun-2021 12:00</p> <p>Date Analysis Commenced : 23-Jun-2021</p> <p>Issue Date : 29-Jun-2021 12:47</p>
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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>
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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



Analytical Results

Sub-Matrix: Soil					Client sample ID	BA2125-A-1	BA2125-A-2	BA2125-A-3	BA2125-A-4	BA2125-A-5
(Matrix: Soil/Solid)					Client sampling date / time	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-001	VA21B2559-002	VA21B2559-003	VA21B2559-004	VA21B2559-005	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.9	19.2	19.8	19.9	19.2	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.3	11.1	11.2	11.3	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	37900	28700	29000	24400	28900	
antimony	7440-36-0	E440	0.10	mg/kg	113	103	109	104	112	
arsenic	7440-38-2	E440	0.10	mg/kg	30.8	27.3	29.6	27.4	29.2	
barium	7440-39-3	E440	0.50	mg/kg	417	439	556	496	471	
beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.39	0.34	0.32	0.35	
bismuth	7440-69-9	E440	0.20	mg/kg	11.0	7.86	9.11	10.3	12.5	
boron	7440-42-8	E440	5.0	mg/kg	150	179	155	162	205	
cadmium	7440-43-9	E440	0.020	mg/kg	11.7	9.43	9.26	10.8	9.93	
calcium	7440-70-2	E440	50	mg/kg	112000	114000	115000	113000	112000	
chromium	7440-47-3	E440	0.50	mg/kg	154	128	225	160	243	
cobalt	7440-48-4	E440	0.10	mg/kg	23.5	29.0	148	23.6	68.9	
copper	7440-50-8	E440	0.50	mg/kg	12000	2590	10400	5660	2280	
iron	7439-89-6	E440	50	mg/kg	65700	56000	82600	81200	65400	
lead	7439-92-1	E440	0.50	mg/kg	1020	379	956	7190	1700	
lithium	7439-93-2	E440	2.0	mg/kg	22.0	25.2	24.7	23.8	36.4	
magnesium	7439-95-4	E440	20	mg/kg	11500	10800	9530	9920	10200	
manganese	7439-96-5	E440	1.0	mg/kg	1080	1030	1150	1020	893	
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	32.8	37.9	40.2	41.0	41.2	
nickel	7440-02-0	E440	0.50	mg/kg	166	191	538	117	233	
phosphorus	7723-14-0	E440	50	mg/kg	10400	9960	9100	9530	8910	
potassium	7440-09-7	E440	100	mg/kg	4740	4420	4420	4260	4500	
selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.29	0.35	0.35	0.36	
silver	7440-22-4	E440	0.10	mg/kg	16.7	4.81	20.1	15.9	6.96	
sodium	7440-23-5	E440	50	mg/kg	13200	13400	13600	12300	13300	
strontium	7440-24-6	E440	0.50	mg/kg	285	310	291	275	273	
sulfur	7704-34-9	E440	1000	mg/kg	13600	12300	12600	14100	13400	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2125-A-1	BA2125-A-2	BA2125-A-3	BA2125-A-4	BA2125-A-5
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-001	VA21B2559-002	VA21B2559-003	VA21B2559-004	VA21B2559-005	
					Result	Result	Result	Result	Result	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.064	0.063	0.052	0.086	0.058	
tin	7440-31-5	E440	2.0	mg/kg	137	86.0	151	1320	132	
titanium	7440-32-6	E440	1.0	mg/kg	676	638	790	542	568	
tungsten	7440-33-7	E440	0.50	mg/kg	12.6	11.0	14.8	12.9	9.33	
uranium	7440-61-1	E440	0.050	mg/kg	5.18	4.78	4.88	4.93	4.85	
vanadium	7440-62-2	E440	0.20	mg/kg	59.5	50.3	50.7	51.6	50.5	
zinc	7440-66-6	E440	2.0	mg/kg	4370	13100	4030	4620	4470	
zirconium	7440-67-7	E440	1.0	mg/kg	2.1	1.6	1.4	1.2	1.4	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.6	11.7	11.6	11.6	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.78	8.32	8.59	7.46	7.82	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	2.85	2.85	2.85	
pH, TCLP final	----	EPP444	0.010	pH units	6.01	6.40	6.16	6.32	6.24	
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	2.30	5.48	2.50	2.30	2.17	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.186	0.423	0.176	0.173	0.174	
calcium, TCLP	7440-70-2	E444	10	mg/L	2120	5020	2230	1990	2010	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	0.955	2.02	1.17	1.72	0.691	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.922	1.74	0.837	0.889	0.818	
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	0.95	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	148	343	155	147	145	
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	1.42	1.21	0.64	0.57	0.63	
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	BA2125-A-1	BA2125-A-2	BA2125-A-3	BA2125-A-4	BA2125-A-5
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-001	VA21B2559-002	VA21B2559-003	VA21B2559-004	VA21B2559-005	
					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	0.24	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	73.4	80.4	47.5	36.2	46.6	46.6
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 (Matrix: Soil/Solid)					Client sample ID	BA2125-A-6	BA2125-A-7	BA2125-A-8	BA2125-A-9	BA2125-A-10
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-006	VA21B2559-007	VA21B2559-008	VA21B2559-009	VA21B2559-010	
					Result	Result	Result	Result	Result	
Physical Tests										
moisture	----	E144	0.25	%	19.4	19.5	17.9	20.2	18.8	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.2	11.2	11.2	11.2	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31000	26700	28000	26200	28800	
antimony	7440-36-0	E440	0.10	mg/kg	109	190	97.3	93.7	102	
arsenic	7440-38-2	E440	0.10	mg/kg	28.6	28.7	26.3	28.2	25.5	
barium	7440-39-3	E440	0.50	mg/kg	493	545	490	446	466	
beryllium	7440-41-7	E440	0.10	mg/kg	0.35	0.44	0.33	0.35	0.34	
bismuth	7440-69-9	E440	0.20	mg/kg	8.56	10.6	8.16	47.4	8.30	
boron	7440-42-8	E440	5.0	mg/kg	187	163	178	137	173	
cadmium	7440-43-9	E440	0.020	mg/kg	12.2	10.7	8.65	9.58	14.6	
calcium	7440-70-2	E440	50	mg/kg	116000	126000	112000	97800	113000	
chromium	7440-47-3	E440	0.50	mg/kg	134	131	124	142	144	
cobalt	7440-48-4	E440	0.10	mg/kg	89.1	40.3	157	30.7	24.5	
copper	7440-50-8	E440	0.50	mg/kg	2200	1910	2000	32000	3470	
iron	7439-89-6	E440	50	mg/kg	71700	50200	61000	66200	63700	
lead	7439-92-1	E440	0.50	mg/kg	649	445	526	2260	885	
lithium	7439-93-2	E440	2.0	mg/kg	32.8	25.0	24.4	19.9	21.1	
magnesium	7439-95-4	E440	20	mg/kg	10700	11700	11000	9370	11000	
manganese	7439-96-5	E440	1.0	mg/kg	1470	755	807	1050	813	
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	36.9	53.8	42.0	32.2	34.6	
nickel	7440-02-0	E440	0.50	mg/kg	121	157	132	414	182	
phosphorus	7723-14-0	E440	50	mg/kg	9880	10200	8540	8560	10800	
potassium	7440-09-7	E440	100	mg/kg	4670	4830	4650	4150	4700	
selenium	7782-49-2	E440	0.20	mg/kg	0.28	0.39	0.27	0.28	0.32	
silver	7440-22-4	E440	0.10	mg/kg	6.21	5.93	5.41	13.4	8.02	
sodium	7440-23-5	E440	50	mg/kg	13800	14100	13800	12000	14200	
strontium	7440-24-6	E440	0.50	mg/kg	298	308	281	230	292	
sulfur	7704-34-9	E440	1000	mg/kg	14200	14200	13100	11700	12900	
thallium	7440-28-0	E440	0.050	mg/kg	0.057	0.053	0.062	0.062	0.053	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2125-A-6	BA2125-A-7	BA2125-A-8	BA2125-A-9	BA2125-A-10
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-006	VA21B2559-007	VA21B2559-008	VA21B2559-009	VA21B2559-010	
					Result	Result	Result	Result	Result	
Metals										
tin	7440-31-5	E440	2.0	mg/kg	102	103	156	318	110	
titanium	7440-32-6	E440	1.0	mg/kg	589	635	870	507	603	
tungsten	7440-33-7	E440	0.50	mg/kg	15.7	10.4	8.99	8.96	11.4	
uranium	7440-61-1	E440	0.050	mg/kg	4.97	5.22	4.64	4.29	4.90	
vanadium	7440-62-2	E440	0.20	mg/kg	52.0	50.4	47.4	43.0	50.0	
zinc	7440-66-6	E440	2.0	mg/kg	3680	3900	4960	23900	4170	
zirconium	7440-67-7	E440	1.0	mg/kg	1.4	1.3	1.5	1.2	1.5	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.7	11.6	11.6	11.6	11.5	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	7.96	7.90	8.13	8.18	7.98	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	2.85	2.85	2.85	
pH, TCLP final	----	EPP444	0.010	pH units	6.25	6.31	6.28	6.40	6.05	
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	2.22	2.20	2.10	2.24	2.01	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.144	0.178	0.159	0.163	0.200	
calcium, TCLP	7440-70-2	E444	10	mg/L	2000	2040	2050	2050	1920	
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	1.22	0.711	0.856	0.832	1.02	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.738	0.934	0.394	0.576	0.976	
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	0.48	<0.25	<0.25	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	140	144	145	142	141	
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	0.51	0.61	0.66	0.47	0.60	
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	
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2125-A-6	BA2125-A-7	BA2125-A-8	BA2125-A-9	BA2125-A-10
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00	16-Jun-2021 09:00
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-006	VA21B2559-007	VA21B2559-008	VA21B2559-009	VA21B2559-010	
					Result	Result	Result	Result	Result	
TCLP Metals										
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
zinc, TCLP	7440-66-6	E444	0.50	mg/L	51.5	32.3	36.0	38.3	50.2	
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	BA2125-A-11	BA2125-A-12	----	----	----
(Matrix: Soil/Solid)										
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-011	VA21B2559-012	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
moisture	----	E144	0.25	%	19.6	18.5	----	----	----	
pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.5	----	----	----	
Metals										
aluminum	7429-90-5	E440	50	mg/kg	31100	33200	----	----	----	
antimony	7440-36-0	E440	0.10	mg/kg	114	101	----	----	----	
arsenic	7440-38-2	E440	0.10	mg/kg	27.8	33.0	----	----	----	
barium	7440-39-3	E440	0.50	mg/kg	440	494	----	----	----	
beryllium	7440-41-7	E440	0.10	mg/kg	0.33	0.31	----	----	----	
bismuth	7440-69-9	E440	0.20	mg/kg	11.6	11.7	----	----	----	
boron	7440-42-8	E440	5.0	mg/kg	164	173	----	----	----	
cadmium	7440-43-9	E440	0.020	mg/kg	13.2	13.8	----	----	----	
calcium	7440-70-2	E440	50	mg/kg	113000	107000	----	----	----	
chromium	7440-47-3	E440	0.50	mg/kg	145	160	----	----	----	
cobalt	7440-48-4	E440	0.10	mg/kg	98.1	27.7	----	----	----	
copper	7440-50-8	E440	0.50	mg/kg	34600	2720	----	----	----	
iron	7439-89-6	E440	50	mg/kg	63800	81200	----	----	----	
lead	7439-92-1	E440	0.50	mg/kg	1090	662	----	----	----	
lithium	7439-93-2	E440	2.0	mg/kg	26.9	20.9	----	----	----	
magnesium	7439-95-4	E440	20	mg/kg	10400	9810	----	----	----	
manganese	7439-96-5	E440	1.0	mg/kg	1100	819	----	----	----	
mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	
molybdenum	7439-98-7	E440	0.10	mg/kg	178	48.3	----	----	----	
nickel	7440-02-0	E440	0.50	mg/kg	154	175	----	----	----	
phosphorus	7723-14-0	E440	50	mg/kg	10200	9470	----	----	----	
potassium	7440-09-7	E440	100	mg/kg	4580	4290	----	----	----	
selenium	7782-49-2	E440	0.20	mg/kg	0.68	0.31	----	----	----	
silver	7440-22-4	E440.Ag	0.10	mg/kg	7.39	----	----	----	----	
silver	7440-22-4	E440	0.10	mg/kg	----	5.75	----	----	----	
sodium	7440-23-5	E440	50	mg/kg	13200	12300	----	----	----	
strontium	7440-24-6	E440	0.50	mg/kg	286	268	----	----	----	
sulfur	7704-34-9	E440	1000	mg/kg	12700	12600	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2125-A-11	BA2125-A-12	----	----	----
Client sampling date / time					16-Jun-2021 09:00	16-Jun-2021 09:00	----	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-011	VA21B2559-012	-----	-----	-----	
					Result	Result	---	---	---	
Metals										
thallium	7440-28-0	E440	0.050	mg/kg	0.055	0.068	----	----	----	
tin	7440-31-5	E440	2.0	mg/kg	134	107	----	----	----	
titanium	7440-32-6	E440	1.0	mg/kg	592	980	----	----	----	
tungsten	7440-33-7	E440	0.50	mg/kg	11.3	9.21	----	----	----	
uranium	7440-61-1	E440	0.050	mg/kg	4.89	4.45	----	----	----	
vanadium	7440-62-2	E440	0.20	mg/kg	51.0	48.4	----	----	----	
zinc	7440-66-6	E440	2.0	mg/kg	4370	6580	----	----	----	
zirconium	7440-67-7	E440	1.0	mg/kg	1.6	1.9	----	----	----	
TCLP Metals										
pH, TCLP 1st preliminary	----	EPP444	0.010	pH units	11.5	11.7	----	----	----	
pH, TCLP 2nd preliminary	----	EPP444	0.010	pH units	8.27	8.25	----	----	----	
pH, TCLP extraction fluid initial	----	EPP444	0.010	pH units	2.85	2.85	----	----	----	
pH, TCLP final	----	EPP444	0.010	pH units	6.32	6.32	----	----	----	
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	2.20	2.18	----	----	----	
cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.364	0.175	----	----	----	
calcium, TCLP	7440-70-2	E444	10	mg/L	1950	2020	----	----	----	
chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	----	----	----	
cobalt, TCLP	7440-48-4	E444	0.050	mg/L	2.04	0.740	----	----	----	
copper, TCLP	7440-50-8	E444	0.050	mg/L	0.709	0.808	----	----	----	
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	0.30	----	----	----	
magnesium, TCLP	7439-95-4	E444	2.5	mg/L	146	143	----	----	----	
mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.61	0.66	----	----	----	
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	----	----	----	



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2125-A-11	BA2125-A-12	----	----	----
					Client sampling date / time	16-Jun-2021 09:00	16-Jun-2021 09:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21B2559-011	VA21B2559-012	-----	-----	-----	
					Result	Result	---	---	---	
TCLP Metals										
uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	----	----	----	
vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	----	----	----	
zinc, TCLP	7440-66-6	E444	0.50	mg/L	31.9	38.4	----	----	----	
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	: VA21B2559	Page	: 1 of 15
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	: 778-370-3279
Project	: Weekly Bottom Ash - Suite	Date Samples Received	: 22-Jun-2021 12:00
PO	: VANCO 0000050390	Issue Date	: 29-Jun-2021 12:47
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Standing Offer (BC work)		
No. of samples received	: 12		
No. of samples analysed	: 12		

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

Key

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

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

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA21B2559-001	BA2125-A-1	bismuth	7440-69-9	E440	44.0 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B2559-001	BA2125-A-1	copper	7440-50-8	E440	110 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B2559-001	BA2125-A-1	nickel	7440-02-0	E440	38.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA21B2559-001	BA2125-A-1	silver	7440-22-4	E440	105 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

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



Analysis Holding Time Compliance

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 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 BA2125-A-11	E440.Ag	16-Jun-2021	28-Jun-2021	----	13 days	✓	28-Jun-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-1	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-10	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-11	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-12	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-2	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 days	2 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag BA2125-A-3	E510	16-Jun-2021	25-Jun-2021	----	9 days	✓	26-Jun-2021	28 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 BA2125-A-4	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2125-A-5	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2125-A-6	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2125-A-7	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2125-A-8	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2125-A-9	E510	16-Jun-2021	25-Jun-2021	----	9 days	✔	26-Jun-2021	28 days	2 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2125-A-1	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2125-A-10	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2125-A-11	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 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 BA2125-A-12	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-2	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-3	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-4	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-5	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-6	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-7	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-8	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 days	✔	
Metals : Metals in Soil/Solid by CRC ICPCS											
LDPE bag BA2125-A-9	E440	16-Jun-2021	25-Jun-2021	----	9 days	✔	27-Jun-2021	180 days	3 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 : Moisture Content by Gravimetry										
LDPE bag BA2125-A-1	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-10	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-11	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-12	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-2	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-3	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-4	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-5	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2125-A-6	E144	16-Jun-2021	----	----	----		24-Jun-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 BA2125-A-7	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2125-A-8	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----		
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2125-A-9	E144	16-Jun-2021	----	----	----		24-Jun-2021	----	----		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-1	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-10	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-11	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-12	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-2	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-3	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	



Matrix: Soil/Solid

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

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-4	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-5	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-6	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-7	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-8	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2125-A-9	E108	16-Jun-2021	25-Jun-2021	----	9 days	✔	25-Jun-2021	30 days	1 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-1	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-10	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-11	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 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) BA2125-A-12	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-2	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-3	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-4	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-5	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-6	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-7	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-8	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2125-A-9	E512	23-Jun-2021	----	----	----		25-Jun-2021	28 days	10 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) BA2125-A-1	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-10	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-11	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-12	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-2	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-3	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-4	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-5	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2125-A-6	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 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) BA2125-A-7	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2125-A-8	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔
TCLP Metals : Metals by CRC ICPMS (TCLP)										
HDPE - total (lab preserved) BA2125-A-9	E444	23-Jun-2021	----	----	----		25-Jun-2021	180 days	10 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-1	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-10	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-11	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-12	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-2	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-3	EPP444	16-Jun-2021	23-Jun-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: 28 day HT (e.g. Hg, CrVI) BA2125-A-4	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-5	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-6	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-7	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-8	EPP444	16-Jun-2021	23-Jun-2021	----	----		----	----	----	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI) BA2125-A-9	EPP444	16-Jun-2021	23-Jun-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	229305	1	13	7.6	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	229306	1	13	7.6	5.0	✔
Moisture Content by Gravimetry	E144	229308	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	229307	1	13	7.6	5.0	✔
Laboratory Control Samples (LCS)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	231792	1	1	100.0	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	229305	2	13	15.3	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	229306	2	13	15.3	10.0	✔
Moisture Content by Gravimetry	E144	229308	1	12	8.3	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	229307	1	13	7.6	5.0	✔
Method Blanks (MB)							
High Silver in Soil/Solid by CRC ICPMS	E440.Ag	231792	1	1	100.0	5.0	✔
Mercury by CVAAS (TCLP)	E512	229648	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	229305	1	13	7.6	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	229649	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	229306	1	13	7.6	5.0	✔
Moisture Content by Gravimetry	E144	229308	1	12	8.3	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	229648	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	229649	1	12	8.3	5.0	✔



Methodology References and Summaries

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

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



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
Digestion for Silver	EP440.Ag Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO ₃ and HCl. This method is intended to liberate metals that may be environmentally available.
TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)	EPP444 Vancouver - Environmental	Soil/Solid	EPA 1311	Preparation of a Toxicity Characteristic Leaching Procedure (TCLP) solid sample involves particle size reduction, homogenization, then determination of appropriate extraction fluid. A measured portion of fresh subsample is placed in an extraction bottle with the appropriate extraction fluid then tumbled in a rotary extractor for 18+/- 2 hours at 23 +/- 2 C. The liquid leachate is filtered to separate from solids then bottled and prepared for analytical tests.



QUALITY CONTROL REPORT

Work Order : VA21B2559

Page : 1 of 11

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 : 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 : 22-Jun-2021 12:00
Date Analysis Commenced : 23-Jun-2021
Issue Date : 29-Jun-2021 12:47

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 Janice Leung, Kevin Duarte, Kim Jensen, Robin Weeks, and Shaneel Dayal.



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: 229307)											
VA21B2559-001	BA2125-A-1	pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.2	0.0%	5%	----
Physical Tests (QC Lot: 229308)											
VA21B2559-001	BA2125-A-1	moisture	----	E144	0.25	%	19.9	19.8	0.695%	20%	----
Metals (QC Lot: 229305)											
VA21B2559-001	BA2125-A-1	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 229306)											
VA21B2559-001	BA2125-A-1	aluminum	7429-90-5	E440	50	mg/kg	37900	27900	30.4%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	113	98.7	13.7%	30%	----
		arsenic	7440-38-2	E440	0.10	mg/kg	30.8	26.4	15.6%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	417	516	21.2%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.33	0.02	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	11.0	7.02	44.0%	30%	DUP-H
		boron	7440-42-8	E440	5.0	mg/kg	150	163	8.22%	30%	----
		cadmium	7440-43-9	E440	0.020	mg/kg	11.7	9.21	23.9%	30%	----
		calcium	7440-70-2	E440	50	mg/kg	112000	113000	0.274%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	154	172	11.5%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	23.5	31.2	28.1%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	12000	3490	110%	30%	DUP-H
		iron	7439-89-6	E440	50	mg/kg	65700	56300	15.4%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	1020	1450	34.8%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	22.0	20.0	9.51%	30%	----
		magnesium	7439-95-4	E440	20	mg/kg	11500	11000	4.66%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	1080	869	21.3%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	32.8	28.2	14.9%	40%	----
		nickel	7440-02-0	E440	0.50	mg/kg	166	245	38.3%	30%	DUP-H
		phosphorus	7723-14-0	E440	50	mg/kg	10400	8630	18.4%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	4740	4310	9.41%	40%	----
		selenium	7782-49-2	E440	0.20	mg/kg	0.33	0.35	0.02	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	16.7	5.18	105%	40%	DUP-H
		sodium	7440-23-5	E440	50	mg/kg	13200	13500	2.44%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	285	285	0.0749%	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: 229306) - continued											
VA21B2559-001	BA2125-A-1	sulfur	7704-34-9	E440	1000	mg/kg	13600	12300	10.2%	30%	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.064	0.056	0.008	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	137	154	12.1%	40%	----
		titanium	7440-32-6	E440	1.0	mg/kg	676	643	5.02%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	12.6	11.4	9.92%	30%	----
		uranium	7440-61-1	E440	0.050	mg/kg	5.18	4.69	9.90%	30%	----
		vanadium	7440-62-2	E440	0.20	mg/kg	59.5	48.0	21.4%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	4370	4450	1.86%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.1	1.2	0.9	Diff <2x LOR	----

Qualifiers

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



Method Blank (MB) Report

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

Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 229308)						
moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 229305)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 229306)						
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: 229306) - 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: 231792)						
silver	7440-22-4	E440.Ag	0.1	mg/kg	<0.10	----
TCLP Metals (QCLot: 229648)						
mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	----
TCLP Metals (QCLot: 229649)						
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: 229307)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 229308)									
moisture	----	E144	0.25	%	50 %	100.0	90.0	110	----
Metals (QCLot: 229305)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	97.0	80.0	120	----
Metals (QCLot: 229306)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	96.6	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	98.3	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	92.2	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	98.1	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	95.2	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	90.8	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	88.1	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	93.9	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	92.3	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	93.4	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	92.5	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	90.5	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	90.4	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	96.2	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	101	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	98.0	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	93.5	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	98.1	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	93.2	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	92.2	80.0	120	----
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	93.5	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	92.9	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	91.0	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	95.6	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	97.5	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	95.0	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	92.3	80.0	120	----



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 229306) - continued									
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	93.5	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	86.1	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.1	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	86.0	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	93.9	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	95.7	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	92.0	80.0	120	----
Metals (QCLot: 231792)									
silver	7440-22-4	E440.Ag	0.1	mg/kg	10 mg/kg	93.1	80.0	120	----



Matrix Spike (MS) Report

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

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
TCLP Metals (QCLot: 229648)										
VA21B2559-001	BA2125-A-1	mercury, TCLP	7439-97-6	E512	0.0011 mg/L	0.001 mg/L	106	50.0	140	----
TCLP Metals (QCLot: 229649)										
VA21B2559-001	BA2125-A-1	antimony, TCLP	7440-36-0	E444	5.2 mg/L	5 mg/L	103	50.0	140	----
		arsenic, TCLP	7440-38-2	E444	4.9 mg/L	5 mg/L	99.0	50.0	140	----
		barium, TCLP	7440-39-3	E444	13.0 mg/L	12.5 mg/L	104	50.0	140	----
		beryllium, TCLP	7440-41-7	E444	0.244 mg/L	0.25 mg/L	97.8	50.0	140	----
		boron, TCLP	7440-42-8	E444	9.55 mg/L	10 mg/L	95.5	50.0	140	----
		cadmium, TCLP	7440-43-9	E444	0.251 mg/L	0.25 mg/L	100	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	1.23 mg/L	1.25 mg/L	98.4	50.0	140	----
		cobalt, TCLP	7440-48-4	E444	ND mg/L	0.25 mg/L	ND	50.0	140	----
		copper, TCLP	7440-50-8	E444	2.38 mg/L	2.5 mg/L	95.1	50.0	140	----
		iron, TCLP	7439-89-6	E444	243 mg/L	250 mg/L	97.3	50.0	140	----
		lead, TCLP	7439-92-1	E444	10.0 mg/L	10 mg/L	100	50.0	140	----
		magnesium, TCLP	7439-95-4	E444	263 mg/L	250 mg/L	105	50.0	140	----
		nickel, TCLP	7440-02-0	E444	2.45 mg/L	2.5 mg/L	97.9	50.0	140	----
		selenium, TCLP	7782-49-2	E444	5.02 mg/L	5 mg/L	100	50.0	140	----
		silver, TCLP	7440-22-4	E444	0.115 mg/L	0.1 mg/L	115	50.0	140	----
		thallium, TCLP	7440-28-0	E444	4.7 mg/L	5 mg/L	93.4	50.0	140	----
		uranium, TCLP	7440-61-1	E444	5.30 mg/L	5 mg/L	106	50.0	150	----
		vanadium, TCLP	7440-62-2	E444	0.75 mg/L	0.75 mg/L	100	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	10 mg/L	10 mg/L	95.5	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: 229305)									
QC-229305-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	91.1	70.0	130	----
Metals (QCLot: 229306)									
QC-229306-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	97.4	70.0	130	----
QC-229306-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	106	70.0	130	----
QC-229306-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	103	70.0	130	----
QC-229306-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	104	40.0	160	----
QC-229306-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	94.2	70.0	130	----
QC-229306-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	96.1	70.0	130	----
QC-229306-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	99.0	70.0	130	----
QC-229306-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	99.5	70.0	130	----
QC-229306-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	97.4	70.0	130	----
QC-229306-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	96.5	70.0	130	----
QC-229306-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	98.1	70.0	130	----
QC-229306-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	104	70.0	130	----
QC-229306-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	101	70.0	130	----
QC-229306-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	101	70.0	130	----
QC-229306-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	97.4	70.0	130	----
QC-229306-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	99.1	70.0	130	----
QC-229306-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	101	70.0	130	----
QC-229306-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	94.6	40.0	160	----
QC-229306-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
QC-229306-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	101	70.0	130	----
QC-229306-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	92.9	70.0	130	----
QC-229306-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	98.7	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: 229306) - continued									
QC-229306-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	104	70.0	130	----
QC-229306-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	88.7	70.0	130	----

