

Bottom Ash Data

2024 Week 38

The following analytical report represents bottom ash composite results for week 38 of 2024 (September 15, 2024 to September 21, 2024).

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 : **VA24C5574**
Client : **Reworld Renewable Burnaby, ULC**
Contact : Nicole Victor
Address : 5150 Riverbend Drive
 Burnaby British Columbia Canada V3N 4V3
Telephone : ----
Project : ----
PO : PO#46693 Weekly Bottom Ash-Suite
C-O-C number : ----
Sampler : ----
Site : (includes 2:1 ph)
Quote number : Covanta Burnaby Standing Offer 2024
No. of samples received : 12
No. of samples analysed : 12

Laboratory : ALS Environmental - Vancouver
Account Manager : Gulraj Dhanaua
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 26-Sep-2024 12:30
Date Analysis Commenced : 05-Oct-2024
Issue Date : 09-Oct-2024 13:20

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>
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		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>
mg/kg	milligrams per kilogram
%	percent
pH units	pH units
mg/L	milligrams per litre

<: 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.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.

Work Order : VA24C5574
Client : Reworld Renewable Burnaby, ULC
Project : ----





Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2438-A-1	BA2438-A-2	BA2438-A-3	BA2438-A-4	BA2438-A-5
Client sampling date / time					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-001	VA24C5574-002	VA24C5574-003	VA24C5574-004	VA24C5574-005	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144/VA	0.25	%	22.7	25.0	22.6	23.6	23.5	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.5	11.5	11.6	11.4	11.3	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	48700	38900	48700	51700	38700	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	115	117	113	124	123	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	30.1	30.1	32.6	35.3	30.5	
Barium	7440-39-3	E440/VA	0.50	mg/kg	500	507	414	427	455	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.37	0.40	0.38	0.38	0.40	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	9.08	14.4	8.58	10.2	15.2	
Boron	7440-42-8	E440/VA	5.0	mg/kg	238	230	192	177	185	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	14.5	15.0	12.4	14.9	11.4	
Calcium	7440-70-2	E440/VA	50	mg/kg	150000	157000	143000	149000	154000	
Chromium	7440-47-3	E440/VA	0.50	mg/kg	161	258	167	148	163	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	44.8	44.0	106	47.0	30.6	
Copper	7440-50-8	E440/VA	0.50	mg/kg	7750	3770	5040	2100	1090	
Iron	7439-89-6	E440/VA	50	mg/kg	35200	50100	54000	40100	59100	
Lead	7439-92-1	E440/VA	0.50	mg/kg	439	387	378	366	387	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	32.0	32.0	28.7	37.8	26.4	
Magnesium	7439-95-4	E440/VA	20	mg/kg	12000	14700	12700	12400	12800	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	725	695	764	746	734	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.104	0.0553	0.0590	0.0735	0.0603	



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID				
					BA2438-A-1	BA2438-A-2	BA2438-A-3	BA2438-A-4	BA2438-A-5
					Client sampling date / time				
					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-001	VA24C5574-002	VA24C5574-003	VA24C5574-004	VA24C5574-005
					Result	Result	Result	Result	Result
Metals									
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	17.4	22.4	19.4	22.2	24.4
Nickel	7440-02-0	E440/VA	0.50	mg/kg	108	130	183	143	105
Phosphorus	7723-14-0	E440/VA	50	mg/kg	9260	9340	8940	10200	8070
Potassium	7440-09-7	E440/VA	100	mg/kg	6400	6890	6580	6950	6260
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.54	0.47	0.40	0.52	0.42
Silver	7440-22-4	E440/VA	0.10	mg/kg	5.04	11.4	5.95	5.34	5.25
Sodium	7440-23-5	E440/VA	50	mg/kg	17800	18100	17600	17800	17700
Strontium	7440-24-6	E440/VA	0.50	mg/kg	644	336	282	304	307
Sulfur	7704-34-9	E440/VA	1000	mg/kg	14900	14700	14100	14800	12900
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/VA	2.0	mg/kg	108	117	281	104	180
Titanium	7440-32-6	E440/VA	1.0	mg/kg	427	403	550	516	300
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	10.9	15.9	6.81	9.89	13.6
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.40	2.46	2.32	2.53	2.35
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	65.2	42.2	47.3	49.6	49.4
Zinc	7440-66-6	E440/VA	2.0	mg/kg	3490	3800	3490	4180	3390
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.5	2.2	3.0	2.7	2.4
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.1	12.1	12.2	12.2	12.2
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	7.97	8.13	7.92	8.33	8.19
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.93	2.93	2.93	2.93	2.93



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID				
					BA2438-A-1	BA2438-A-2	BA2438-A-3	BA2438-A-4	BA2438-A-5
					Client sampling date / time				
					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-001	VA24C5574-002	VA24C5574-003	VA24C5574-004	VA24C5574-005
					Result	Result	Result	Result	Result
TCLP Metals									
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.77	6.85	6.35	6.58	6.90
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.25	2.32	2.36	2.22	2.44
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.128	0.197	0.193	0.186	0.142
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	1970	2030	2110	1970	2040
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.33	1.12	1.32	1.36	1.17
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.15	1.17	1.49	1.67	1.11
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	134	138	142	135	129
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.31	0.35	0.48	0.34	0.34
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2438-A-1	BA2438-A-2	BA2438-A-3	BA2438-A-4	BA2438-A-5
Client sampling date / time					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-001	VA24C5574-002	VA24C5574-003	VA24C5574-004	VA24C5574-005	
					Result	Result	Result	Result	Result	
TCLP Metals										
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	12.0	12.4	32.9	19.5	8.31	
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID	BA2438-A-6	BA2438-A-7	BA2438-A-8	BA2438-A-9	BA2438-A-10
Client sampling date / time					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-006	VA24C5574-007	VA24C5574-008	VA24C5574-009	VA24C5574-010	
					Result	Result	Result	Result	Result	
Physical Tests										
Moisture	----	E144/VA	0.25	%	23.3	22.3	22.5	21.3	21.1	
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.8	11.7	11.7	11.3	11.2	
Metals										
Aluminum	7429-90-5	E440/VA	50	mg/kg	40200	49300	40800	54000	44100	
Antimony	7440-36-0	E440/VA	0.10	mg/kg	125	113	97.6	103	102	
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	33.9	28.9	22.3	24.1	26.7	
Barium	7440-39-3	E440/VA	0.50	mg/kg	376	557	645	571	568	
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.38	0.38	0.37	0.37	0.37	
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	10.1	9.15	7.17	9.43	18.3	
Boron	7440-42-8	E440/VA	5.0	mg/kg	189	304	197	216	222	
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	12.4	11.6	10.5	10.8	11.1	
Calcium	7440-70-2	E440/VA	50	mg/kg	157000	145000	128000	133000	139000	



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID	BA2438-A-6	BA2438-A-7	BA2438-A-8	BA2438-A-9	BA2438-A-10
					Client sampling date / time	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-006	VA24C5574-007	VA24C5574-008	VA24C5574-009	VA24C5574-010	
					Result	Result	Result	Result	Result	
Metals										
Chromium	7440-47-3	E440/VA	0.50	mg/kg	154	120	112	119	173	
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	34.3	33.4	48.2	22.6	32.3	
Copper	7440-50-8	E440/VA	0.50	mg/kg	1260	1190	2490	4280	941	
Iron	7439-89-6	E440/VA	50	mg/kg	45400	32900	39900	39600	53800	
Lead	7439-92-1	E440/VA	0.50	mg/kg	496	375	294	414	444	
Lithium	7439-93-2	E440/VA	2.0	mg/kg	28.6	34.3	23.0	26.2	24.7	
Magnesium	7439-95-4	E440/VA	20	mg/kg	11500	14400	10200	11000	11300	
Manganese	7439-96-5	E440/VA	1.0	mg/kg	667	715	688	762	876	
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	0.0716	0.0680	0.0706	<0.0500	<0.0500	
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	17.4	18.8	17.6	16.8	18.0	
Nickel	7440-02-0	E440/VA	0.50	mg/kg	94.8	111	79.0	70.3	200	
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10900	10600	9220	9030	11000	
Potassium	7440-09-7	E440/VA	100	mg/kg	6830	6390	5280	5830	6420	
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.52	0.45	0.38	0.64	0.48	
Silver	7440-22-4	E440/VA	0.10	mg/kg	6.02	4.55	4.71	6.58	5.28	
Sodium	7440-23-5	E440/VA	50	mg/kg	18200	18900	15400	16300	16800	
Strontium	7440-24-6	E440/VA	0.50	mg/kg	323	305	309	302	286	
Sulfur	7704-34-9	E440/VA	1000	mg/kg	14700	14300	10600	12000	11900	
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	
Tin	7440-31-5	E440/VA	2.0	mg/kg	120	122	79.1	94.0	589	
Titanium	7440-32-6	E440/VA	1.0	mg/kg	292	409	248	453	711	



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID				
					BA2438-A-6	BA2438-A-7	BA2438-A-8	BA2438-A-9	BA2438-A-10
					Client sampling date / time				
					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-006	VA24C5574-007	VA24C5574-008	VA24C5574-009	VA24C5574-010
					Result	Result	Result	Result	Result
Metals									
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	10.4	8.56	5.77	6.90	9.83
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.64	2.46	2.16	2.24	2.19
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	48.1	48.8	44.5	55.1	52.6
Zinc	7440-66-6	E440/VA	2.0	mg/kg	4640	3340	2640	3450	3590
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	2.6	2.8	2.7	3.1	2.2
TCLP Metals									
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.2	12.1	12.1	12.0	12.0
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	6.61	5.41	5.84	8.36	7.20
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.93	2.93	2.93	2.93	2.93
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.88	6.69	6.45	6.47	6.69
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	<1.00	<1.00	<1.00
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.22	2.30	2.16	2.32	2.38
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.164	0.167	0.142	0.241	0.151
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2020	2020	1970	2080	2040
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	2.61	0.910	0.997	0.824	0.992
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.03	1.24	0.461	1.30	1.40
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0



Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID				
					BA2438-A-6	BA2438-A-7	BA2438-A-8	BA2438-A-9	BA2438-A-10
Client sampling date / time					18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00	18-Sep-2024 09:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-006	VA24C5574-007	VA24C5574-008	VA24C5574-009	VA24C5574-010
					Result	Result	Result	Result	Result
TCLP Metals									
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	<0.25
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	130	129	130	145	140
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.29	0.36	0.45	0.44	0.34
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	15.6	19.1	25.1	31.5	14.2
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	<10	<10	<10

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Soil (Matrix: Soil/Solid)					Client sample ID				
					BA2438-A-11	BA2438-A-12	----	----	----
Client sampling date / time					18-Sep-2024 09:00	18-Sep-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-011	VA24C5574-012	----	----	----
					Result	Result	----	----	----
Physical Tests									
Moisture	----	E144/VA	0.25	%	24.1	24.3	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units	11.2	11.2	----	----	----



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID		BA2438-A-11	BA2438-A-12	----	----	----
					Client sampling date / time		18-Sep-2024 09:00	18-Sep-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-011	VA24C5574-012	----	----	----	----	----
					Result	Result	----	----	----	----	----
Metals											
Aluminum	7429-90-5	E440/VA	50	mg/kg	48200	53300	----	----	----	----	----
Antimony	7440-36-0	E440/VA	0.10	mg/kg	114	228	----	----	----	----	----
Arsenic	7440-38-2	E440/VA	0.10	mg/kg	34.3	31.4	----	----	----	----	----
Barium	7440-39-3	E440/VA	0.50	mg/kg	523	568	----	----	----	----	----
Beryllium	7440-41-7	E440/VA	0.10	mg/kg	0.33	0.40	----	----	----	----	----
Bismuth	7440-69-9	E440/VA	0.20	mg/kg	7.94	8.62	----	----	----	----	----
Boron	7440-42-8	E440/VA	5.0	mg/kg	180	293	----	----	----	----	----
Cadmium	7440-43-9	E440/VA	0.020	mg/kg	11.6	11.6	----	----	----	----	----
Calcium	7440-70-2	E440/VA	50	mg/kg	136000	143000	----	----	----	----	----
Chromium	7440-47-3	E440/VA	0.50	mg/kg	230	159	----	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.10	mg/kg	170	34.5	----	----	----	----	----
Copper	7440-50-8	E440/VA	0.50	mg/kg	1140	1400	----	----	----	----	----
Iron	7439-89-6	E440/VA	50	mg/kg	51900	51400	----	----	----	----	----
Lead	7439-92-1	E440/VA	0.50	mg/kg	1420	409	----	----	----	----	----
Lithium	7439-93-2	E440/VA	2.0	mg/kg	30.7	26.6	----	----	----	----	----
Magnesium	7439-95-4	E440/VA	20	mg/kg	11500	12500	----	----	----	----	----
Manganese	7439-96-5	E440/VA	1.0	mg/kg	6250	715	----	----	----	----	----
Mercury	7439-97-6	E510/VA	0.0500	mg/kg	<0.0500	<0.0500	----	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.10	mg/kg	37.7	18.6	----	----	----	----	----
Nickel	7440-02-0	E440/VA	0.50	mg/kg	213	142	----	----	----	----	----
Phosphorus	7723-14-0	E440/VA	50	mg/kg	10700	10100	----	----	----	----	----



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID		BA2438-A-11	BA2438-A-12	----	----	----
					Client sampling date / time		18-Sep-2024 09:00	18-Sep-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-011	VA24C5574-012	----	----	----	----	----
					Result	Result	----	----	----	----	----
Metals											
Potassium	7440-09-7	E440/VA	100	mg/kg	5990	6300	----	----	----	----	----
Selenium	7782-49-2	E440/VA	0.20	mg/kg	0.49	0.42	----	----	----	----	----
Silver	7440-22-4	E440/VA	0.10	mg/kg	4.71	9.76	----	----	----	----	----
Sodium	7440-23-5	E440/VA	50	mg/kg	16600	16900	----	----	----	----	----
Strontium	7440-24-6	E440/VA	0.50	mg/kg	276	330	----	----	----	----	----
Sulfur	7704-34-9	E440/VA	1000	mg/kg	13200	13900	----	----	----	----	----
Thallium	7440-28-0	E440/VA	0.050	mg/kg	<0.100 ^{DLB}	<0.050	----	----	----	----	----
Tin	7440-31-5	E440/VA	2.0	mg/kg	94.6	171	----	----	----	----	----
Titanium	7440-32-6	E440/VA	1.0	mg/kg	362	349	----	----	----	----	----
Tungsten	7440-33-7	E440/VA	0.50	mg/kg	7.48	11.5	----	----	----	----	----
Uranium	7440-61-1	E440/VA	0.050	mg/kg	2.17	2.35	----	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.20	mg/kg	46.1	148	----	----	----	----	----
Zinc	7440-66-6	E440/VA	2.0	mg/kg	8710	3180	----	----	----	----	----
Zirconium	7440-67-7	E440/VA	1.0	mg/kg	4.2	4.8	----	----	----	----	----
TCLP Metals											
pH, TCLP 1st preliminary	----	EPP444/VA	0.010	pH units	12.0	12.0	----	----	----	----	----
pH, TCLP 2nd preliminary	----	EPP444/VA	0.010	pH units	5.76	5.39	----	----	----	----	----
pH, TCLP extraction fluid initial	----	EPP444/VA	0.010	pH units	2.93	2.93	----	----	----	----	----
pH, TCLP final	----	EPP444/VA	0.010	pH units	6.67	6.64	----	----	----	----	----
Antimony, TCLP	7440-36-0	E444/VA	1.00	mg/L	<1.00	<1.00	----	----	----	----	----
Arsenic, TCLP	7440-38-2	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----	----	----



Analytical Results

Sub-Matrix: Soil
 (Matrix: Soil/Solid)

					Client sample ID		BA2438-A-11	BA2438-A-12	----	----	----
					Client sampling date / time		18-Sep-2024 09:00	18-Sep-2024 09:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C5574-011	VA24C5574-012	----	----	----		
					Result	Result	----	----	----		
TCLP Metals											
Barium, TCLP	7440-39-3	E444/VA	2.5	mg/L	<2.5	<2.5	----	----	----		
Beryllium, TCLP	7440-41-7	E444/VA	0.025	mg/L	<0.025	<0.025	----	----	----		
Boron, TCLP	7440-42-8	E444/VA	0.50	mg/L	2.36	4.65	----	----	----		
Cadmium, TCLP	7440-43-9	E444/VA	0.050	mg/L	0.157	0.162	----	----	----		
Calcium, TCLP	7440-70-2	E444/VA	10	mg/L	2040	1970	----	----	----		
Chromium, TCLP	7440-47-3	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----		
Cobalt, TCLP	7440-48-4	E444/VA	0.050	mg/L	1.00	1.54	----	----	----		
Copper, TCLP	7440-50-8	E444/VA	0.050	mg/L	1.24	0.917	----	----	----		
Iron, TCLP	7439-89-6	E444/VA	5.0	mg/L	<5.0	<5.0	----	----	----		
Lead, TCLP	7439-92-1	E444/VA	0.25	mg/L	<0.25	<0.25	----	----	----		
Magnesium, TCLP	7439-95-4	E444/VA	2.5	mg/L	140	142	----	----	----		
Mercury, TCLP	7439-97-6	E512/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----		
Nickel, TCLP	7440-02-0	E444/VA	0.25	mg/L	0.36	0.36	----	----	----		
Selenium, TCLP	7782-49-2	E444/VA	0.10	mg/L	<0.10	<0.10	----	----	----		
Silver, TCLP	7440-22-4	E444/VA	0.050	mg/L	<0.050	<0.050	----	----	----		
Thallium, TCLP	7440-28-0	E444/VA	1.0	mg/L	<1.0	<1.0	----	----	----		
Uranium, TCLP	7440-61-1	E444/VA	0.20	mg/L	<0.20	<0.20	----	----	----		
Vanadium, TCLP	7440-62-2	E444/VA	0.15	mg/L	<0.15	<0.15	----	----	----		
Zinc, TCLP	7440-66-6	E444/VA	0.50	mg/L	18.9	14.7	----	----	----		
Zirconium, TCLP	7440-67-7	E444/VA	10	mg/L	<10	<10	----	----	----		

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : VA24C5574</p> <p>Client : Reworld Renewable Burnaby, ULC</p> <p>Contact : Nicole Victor</p> <p>Address : 5150 Riverbend Drive Burnaby BC Canada V3N 4V3</p> <p>Telephone : ----</p> <p>Project : ----</p> <p>PO : PO#46693 Weekly Bottom Ash-Suite</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : (includes 2:1 ph)</p> <p>Quote number : Covanta Burnaby Standing Offer 2024</p> <p>No. of samples received : 12</p> <p>No. of samples analysed : 12</p>	<p>Page : 1 of 17</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Gulraj Dhanaua</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 26-Sep-2024 12:30</p> <p>Issue Date : 09-Oct-2024 13:20</p>
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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 Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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
Method Blank (MB) Values								
Metals	QC-MRG2-1692216 001	----	Bismuth	7440-69-9	E440	0.30 ^B mg/kg	0.2 mg/kg	Blank result exceeds permitted value
Metals	QC-MRG2-1692216 001	----	Cadmium	7440-43-9	E440	0.031 ^{MB-LOR} mg/kg	0.02 mg/kg	Blank result exceeds permitted value
Metals	QC-MRG2-1692216 001	----	Thallium	7440-28-0	E440	0.292 ^{MB-LOR} mg/kg	0.05 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Duplicate (DUP) RPDs								
Metals	VA24C5574-012	BA2438-A-12	Antimony	7440-36-0	E440	74.9 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Boron	7440-42-8	E440	38.7 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Cobalt	7440-48-4	E440	98.1 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Copper	7440-50-8	E440	33.8 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Iron	7439-89-6	E440	63.6 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Manganese	7439-96-5	E440	78.2 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Molybdenum	7439-98-7	E440	61.9 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Nickel	7440-02-0	E440	56.8 % ^{DUP-H}	30%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Selenium	7782-49-2	E440	0.44 % ^{DUP-H, J}	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	Anonymous	Anonymous	Silver	7440-22-4	E440	120 % ^{DUP-H}	40%	Duplicate RPD does not meet the DQO for this test.



Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs - Continued								
Metals	VA24C5574-012	BA2438-A-12	Silver	7440-22-4	E440	88.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Tin	7440-31-5	E440	51.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Vanadium	7440-62-2	E440	39.3 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C5574-012	BA2438-A-12	Vanadium	7440-62-2	E440	117 % 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.
J	Duplicate results and limits are expressed in terms of absolute difference.



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 : Analytical Method 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 BA2438-A-1	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-2	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-3	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-4	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-5	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-6	E510	18-Sep-2024	06-Oct-2024	28 days	18 days	✔	07-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-10	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2438-A-11	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-12	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-7	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-8	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	
Metals : Mercury in Soil/Solid by CVAAS											
LDPE bag BA2438-A-9	E510	18-Sep-2024	07-Oct-2024	28 days	19 days	✔	08-Oct-2024	28 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-1	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✔	08-Oct-2024	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-2	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✔	08-Oct-2024	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-3	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✔	08-Oct-2024	180 days	20 days	✔	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-4	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✔	08-Oct-2024	180 days	20 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2438-A-5	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✓	08-Oct-2024	180 days	20 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-6	E440	18-Sep-2024	06-Oct-2024	180 days	18 days	✓	08-Oct-2024	180 days	20 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-10	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-11	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-12	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-7	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-8	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Metals : Metals in Soil/Solid by CRC ICPMS											
LDPE bag BA2438-A-9	E440	18-Sep-2024	07-Oct-2024	180 days	19 days	✓	09-Oct-2024	180 days	21 days	✓	
Physical Tests : Moisture Content by Gravimetry											
LDPE bag BA2438-A-1	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days		



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2438-A-2	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-3	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-4	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-5	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-6	E144	18-Sep-2024	----	----	----		04-Oct-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-10	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-11	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-12	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-7	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2438-A-8	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag BA2438-A-9	E144	18-Sep-2024	----	----	----		05-Oct-2024	----	17 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-1	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-2	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-3	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-4	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-5	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-6	E108	18-Sep-2024	06-Oct-2024	30 days	18 days	✔	07-Oct-2024	30 days	19 days	✔
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag BA2438-A-10	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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 BA2438-A-11	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2438-A-12	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2438-A-7	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2438-A-8	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)											
LDPE bag BA2438-A-9	E108	18-Sep-2024	07-Oct-2024	30 days	19 days	✔	07-Oct-2024	30 days	19 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-1	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-10	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-11	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-12	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2438-A-2	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-3	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-4	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-5	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-6	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-7	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-8	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Mercury by CVAAS (TCLP)											
Glass vial - total (lab preserved) BA2438-A-9	E512	05-Oct-2024	08-Oct-2024	45 days	20 days	✔	08-Oct-2024	45 days	20 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-1	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2438-A-10	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-11	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-12	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-2	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-3	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-4	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-5	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-6	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-7	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	



Matrix: Soil/Solid

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

Analyte Group : Analytical Method 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) BA2438-A-8	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : Metals by CRC ICPMS (TCLP)											
HDPE - total (lab preserved) BA2438-A-9	E444	05-Oct-2024	08-Oct-2024	197 days	20 days	✔	09-Oct-2024	197 days	21 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-1	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-10	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-11	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-12	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-2	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-3	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)											
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-4	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔	



Matrix: **Soil/Solid**

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

Analyte Group : Analytical Method 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, PFAS) BA2438-A-5	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-6	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-7	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-8	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔
TCLP Metals : TCLP Leachate Preparation (Metals, Inorganics, and SVOCs)										
Lab Split - Non-Volatile Leach: 28 day HT (e.g. Hg, CrVI, PFAS) BA2438-A-9	EPP444	18-Sep-2024	05-Oct-2024	----	----		----	28 days	17 days	✔

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 by CVAAS (TCLP)	E512	1696650	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1692217	2	27	7.4	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1696649	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1691741	2	31	6.4	5.0	✔
Moisture Content by Gravimetry	E144	1692221	2	23	8.7	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1692218	2	27	7.4	5.0	✔
Laboratory Control Samples (LCS)							
Mercury in Soil/Solid by CVAAS	E510	1692217	4	27	14.8	10.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1691741	4	31	12.9	10.0	✔
Moisture Content by Gravimetry	E144	1692221	2	23	8.7	5.0	✔
pH by Meter (1:2 Soil:Water Extraction)	E108	1692218	2	27	7.4	5.0	✔
Method Blanks (MB)							
Mercury by CVAAS (TCLP)	E512	1696650	1	12	8.3	5.0	✔
Mercury in Soil/Solid by CVAAS	E510	1692217	2	27	7.4	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1696649	1	12	8.3	5.0	✔
Metals in Soil/Solid by CRC ICPMS	E440	1691741	2	31	6.4	5.0	✔
Moisture Content by Gravimetry	E144	1692221	2	23	8.7	5.0	✔
Matrix Spikes (MS)							
Mercury by CVAAS (TCLP)	E512	1696650	1	12	8.3	5.0	✔
Metals by CRC ICPMS (TCLP)	E444	1696649	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Metals by CRC ICPMS (TCLP)	E444 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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 ALS Environmental - Vancouver	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	: VA24C5574	Page	: 1 of 17
Client	: Reworld Renewable Burnaby, ULC	Laboratory	: ALS Environmental - Vancouver
Contact	: Nicole Victor	Account Manager	: Gulraj Dhanaua
Address	: 5150 Riverbend Drive Burnaby BC Canada V3N 4V3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 26-Sep-2024 12:30
PO	: PO#46693 Weekly Bottom Ash-Suite	Date Analysis Commenced	: 04-Oct-2024
C-O-C number	: ----	Issue Date	: 09-Oct-2024 13:20
Sampler	: ----		
Site	: (includes 2:1 ph)		
Quote number	: Covanta Burnaby Standing Offer 2024		
No. of samples received	: 12		
No. of samples analysed	: 12		

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 Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

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>
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia

Page : 2 of 17
Work Order : VA24C5574
Client : Reworld Renewable Burnaby, ULC
Project : ----



General Comments

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

Key :

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

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

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

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

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



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: 1691743)											
FJ2402980-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.84	7.89	0.6%	5%	----
Physical Tests (QC Lot: 1691746)											
FJ2402980-001	Anonymous	Moisture	----	E144	0.25	%	22.8	22.5	1.56%	20%	----
Physical Tests (QC Lot: 1692218)											
VA24C5574-012	BA2438-A-12	pH (1:2 soil:water)	----	E108	0.10	pH units	11.2	11.4	1.2%	5%	----
Physical Tests (QC Lot: 1692221)											
VA24C5574-007	BA2438-A-7	Moisture	----	E144	0.25	%	22.3	22.5	1.15%	20%	----
Metals (QC Lot: 1691741)											
FJ2402980-001	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	4210	5090	18.9%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.67	0.62	0.06	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	4.90	4.74	3.20%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	195	256	27.4%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.48	0.55	0.06	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	5.2	0.2	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	2.12	2.03	4.10%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	12800	12800	0.472%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	12.7	16.6	26.7%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	5.11	6.72	27.2%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	15.7	15.6	1.01%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	12600	24400	63.6%	30%	DUP-H
		Lead	7439-92-1	E440	0.50	mg/kg	6.91	6.98	1.07%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	3.0	3.6	0.6	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	4510	4390	2.79%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	261	597	78.2%	30%	DUP-H
		Molybdenum	7439-98-7	E440	0.10	mg/kg	0.93	1.77	61.9%	40%	DUP-H
		Nickel	7440-02-0	E440	0.50	mg/kg	26.1	32.1	20.4%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	1020	1110	7.94%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	1140	1450	24.1%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.63	# 1.07	0.44	Diff <2x LOR	DUP-H,J



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: 1691741) - continued											
FJ2402980-001	Anonymous	Silver	7440-22-4	E440	0.10	mg/kg	0.80	0.20	120%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	60	74	13	Diff <2x LOR	---
		Strontium	7440-24-6	E440	0.50	mg/kg	34.9	36.2	3.59%	40%	---
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	---
		Thallium	7440-28-0	E440	0.050	mg/kg	0.130	0.164	0.034	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	4.4	6.4	37.2%	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	0.895	0.939	4.73%	30%	---
		Vanadium	7440-62-2	E440	0.20	mg/kg	25.5	38.1	39.3%	30%	DUP-H
		Zinc	7440-66-6	E440	2.0	mg/kg	142	127	11.6%	30%	---
Zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	---		
Metals (QC Lot: 1691742)											
FJ2402980-001	Anonymous	Mercury	7439-97-6	E510	0.0500	mg/kg	0.125	<0.0500	0.0752	Diff <2x LOR	---
Metals (QC Lot: 1692216)											
VA24C5574-012	BA2438-A-12	Aluminum	7429-90-5	E440	50	mg/kg	53300	37400	35.1%	40%	---
		Antimony	7440-36-0	E440	0.10	mg/kg	228	104	74.9%	30%	DUP-H
		Arsenic	7440-38-2	E440	0.10	mg/kg	31.4	26.7	16.0%	30%	---
		Barium	7440-39-3	E440	0.50	mg/kg	568	559	1.70%	40%	---
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.40	0.41	0.010	Diff <2x LOR	---
		Bismuth	7440-69-9	E440	0.20	mg/kg	8.62	8.13	5.75%	30%	---
		Boron	7440-42-8	E440	5.0	mg/kg	293	198	38.7%	30%	DUP-H
		Cadmium	7440-43-9	E440	0.020	mg/kg	11.6	11.2	3.08%	30%	---
		Calcium	7440-70-2	E440	50	mg/kg	143000	137000	4.61%	30%	---
		Chromium	7440-47-3	E440	0.50	mg/kg	159	192	18.4%	30%	---
		Cobalt	7440-48-4	E440	0.10	mg/kg	34.5	101	98.1%	30%	DUP-H
		Copper	7440-50-8	E440	0.50	mg/kg	1400	991	33.8%	30%	DUP-H
		Iron	7439-89-6	E440	50	mg/kg	51400	51000	0.725%	30%	---
		Lead	7439-92-1	E440	0.50	mg/kg	409	302	29.8%	40%	---
		Lithium	7439-93-2	E440	2.0	mg/kg	26.6	35.2	27.6%	30%	---
		Magnesium	7439-95-4	E440	20	mg/kg	12500	12200	2.40%	30%	---
		Manganese	7439-96-5	E440	1.0	mg/kg	715	832	15.1%	30%	---
		Molybdenum	7439-98-7	E440	0.10	mg/kg	18.6	15.8	16.0%	40%	---
Nickel	7440-02-0	E440	0.50	mg/kg	142	78.9	56.8%	30%	DUP-H		



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: 1692216) - continued											
VA24C5574-012	BA2438-A-12	Phosphorus	7723-14-0	E440	50	mg/kg	10100	12600	21.6%	30%	---
		Potassium	7440-09-7	E440	100	mg/kg	6300	6170	2.15%	40%	---
		Selenium	7782-49-2	E440	0.20	mg/kg	0.42	0.49	0.06	Diff <2x LOR	---
		Silver	7440-22-4	E440	0.10	mg/kg	9.76	3.80	88.0%	40%	DUP-H
		Sodium	7440-23-5	E440	50	mg/kg	16900	16500	2.26%	40%	---
		Strontium	7440-24-6	E440	0.50	mg/kg	330	297	10.4%	40%	---
		Sulfur	7704-34-9	E440	1000	mg/kg	13900	13000	6.39%	30%	---
		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	171	100	51.9%	40%	DUP-H
		Titanium	7440-32-6	E440	1.0	mg/kg	349	245	35.2%	40%	---
		Tungsten	7440-33-7	E440	0.50	mg/kg	11.5	14.1	20.2%	30%	---
		Uranium	7440-61-1	E440	0.050	mg/kg	2.35	2.16	8.11%	30%	---
		Vanadium	7440-62-2	E440	0.20	mg/kg	148	38.7	117%	30%	DUP-H
		Zinc	7440-66-6	E440	2.0	mg/kg	3180	3300	3.58%	30%	---
Zirconium	7440-67-7	E440	1.0	mg/kg	4.8	2.9	1.9	Diff <2x LOR	---		
Metals (QC Lot: 1692217)											
VA24C5574-012	BA2438-A-12	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	0.0701	0.0201	Diff <2x LOR	---
TCLP Metals (QC Lot: 1696649)											
VA24C5574-001	BA2438-A-1	Antimony, TCLP	7440-36-0	E444	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	---
		Arsenic, TCLP	7440-38-2	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	---
		Barium, TCLP	7440-39-3	E444	2.5	mg/L	<2.5	<2.5	0	Diff <2x LOR	---
		Beryllium, TCLP	7440-41-7	E444	0.025	mg/L	<0.025	<0.025	0	Diff <2x LOR	---
		Boron, TCLP	7440-42-8	E444	0.50	mg/L	2.25	2.12	0.13	Diff <2x LOR	---
		Cadmium, TCLP	7440-43-9	E444	0.050	mg/L	0.128	0.129	0.0004	Diff <2x LOR	---
		Calcium, TCLP	7440-70-2	E444	10	mg/L	1970	1900	3.62%	30%	---
		Chromium, TCLP	7440-47-3	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	---
		Cobalt, TCLP	7440-48-4	E444	0.050	mg/L	1.33	1.31	1.17%	30%	---
		Copper, TCLP	7440-50-8	E444	0.050	mg/L	1.15	1.15	0.526%	30%	---
		Iron, TCLP	7439-89-6	E444	5.0	mg/L	<5.0	<5.0	0	Diff <2x LOR	---
		Lead, TCLP	7439-92-1	E444	0.25	mg/L	<0.25	<0.25	0	Diff <2x LOR	---
		Magnesium, TCLP	7439-95-4	E444	2.5	mg/L	134	131	2.36%	30%	---
		Nickel, TCLP	7440-02-0	E444	0.25	mg/L	0.31	0.31	0.0003	Diff <2x LOR	---
		Selenium, TCLP	7782-49-2	E444	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	---
Silver, TCLP	7440-22-4	E444	0.050	mg/L	<0.050	<0.050	0	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
TCLP Metals (QC Lot: 1696649) - continued											
VA24C5574-001	BA2438-A-1	Thallium, TCLP	7440-28-0	E444	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Uranium, TCLP	7440-61-1	E444	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Vanadium, TCLP	7440-62-2	E444	0.15	mg/L	<0.15	<0.15	0	Diff <2x LOR	----
		Zinc, TCLP	7440-66-6	E444	0.50	mg/L	12.0	11.9	0.654%	30%	----
		Zirconium, TCLP	7440-67-7	E444	10	mg/L	<10	<10	0	Diff <2x LOR	----
TCLP Metals (QC Lot: 1696650)											
VA24C5574-001	BA2438-A-1	Mercury, TCLP	7439-97-6	E512	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.



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: 1691746)						
Moisture	---	E144	0.25	%	<0.25	---
Physical Tests (QCLot: 1692221)						
Moisture	---	E144	0.25	%	<0.25	---
Metals (QCLot: 1691741)						
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: 1691741) - 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: 1691742)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1692216)						
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	# 0.30	B
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	# 0.031	MB-LOR
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	----



Sub-Matrix: Soil/Solid

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1692216) - continued						
Thallium	7440-28-0	E440	0.05	mg/kg	# 0.292	MB-LOR
Tin	7440-31-5	E440	2	mg/kg	<2.0	---
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: 1692217)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	---
TCLP Metals (QCLot: 1696649)						
Antimony, TCLP	7440-36-0	E444	0.1	mg/L	<0.10	---
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	---
TCLP Metals (QCLot: 1696650)						
Mercury, TCLP	7439-97-6	E512	0.001	mg/L	<0.0010	---

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Work Order : VA24C5574
Client : Reworld Renewable Burnaby, ULC
Project : ---



Qualifiers

<i>Qualifier</i>	<i>Description</i>
<i>B</i>	<i>Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.</i>
<i>MB-LOR</i>	<i>Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.</i>



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				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1691743)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	100	95.0	105	---
Physical Tests (QCLot: 1691746)									
Moisture	---	E144	0.25	%	50 %	101	90.0	110	---
Physical Tests (QCLot: 1692218)									
pH (1:2 soil:water)	---	E108	---	pH units	6 pH units	101	95.0	105	---
Physical Tests (QCLot: 1692221)									
Moisture	---	E144	0.25	%	50 %	99.5	90.0	110	---
Metals (QCLot: 1691741)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	108	80.0	120	---
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	96.0	80.0	120	---
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	---
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	---
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	---
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	89.9	80.0	120	---
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	101	80.0	120	---
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	105	80.0	120	---
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	101	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	---
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	102	80.0	120	---
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	104	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	99.0	80.0	120	---
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	107	80.0	120	---
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	110	80.0	120	---
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	103	80.0	120	---
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	99.2	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	104	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	104	80.0	120	---
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	---
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	91.4	80.0	120	---
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	---



Sub-Matrix: Soil/Solid

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Target Concentration	LCS	Low	High	
Metals (QCLot: 1691741) - continued									
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	---
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	---
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	93.8	80.0	120	---
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	97.8	80.0	120	---
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	105	80.0	120	---
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	96.9	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	105	80.0	120	---
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	103	80.0	120	---
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	101	80.0	120	---
Metals (QCLot: 1691742)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	---
Metals (QCLot: 1692216)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	104	80.0	120	---
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	102	80.0	120	---
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	104	80.0	120	---
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	104	80.0	120	---
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	104	80.0	120	---
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	---
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	101	80.0	120	---
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.3	80.0	120	---
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	100	80.0	120	---
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	---
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	98.3	80.0	120	---
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.7	80.0	120	---
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	100	80.0	120	---
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	103	80.0	120	---
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	105	80.0	120	---
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	107	80.0	120	---
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	99.4	80.0	120	---
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	101	80.0	120	---
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	98.4	80.0	120	---
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	113	80.0	120	---
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	102	80.0	120	---
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	---
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	90.2	80.0	120	---



Sub-Matrix: Soil/Solid

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1692216) - continued									
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	98.7	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	103	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	100.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	101	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	93.9	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	105	80.0	120	----
Metals (QCLot: 1692217)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	107	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: 1696649)										
VA24C5574-001	BA2438-A-1	Antimony, TCLP	7440-36-0	E444	5.12 mg/L	5 mg/L	102	50.0	140	----
		Arsenic, TCLP	7440-38-2	E444	5.2 mg/L	5 mg/L	104	50.0	140	----
		Barium, TCLP	7440-39-3	E444	13.4 mg/L	12.5 mg/L	108	50.0	140	----
		Beryllium, TCLP	7440-41-7	E444	0.245 mg/L	0.25 mg/L	98.0	50.0	140	----
		Boron, TCLP	7440-42-8	E444	9.16 mg/L	10 mg/L	91.6	50.0	140	----
		Cadmium, TCLP	7440-43-9	E444	0.247 mg/L	0.25 mg/L	98.8	50.0	140	----
		Calcium, TCLP	7440-70-2	E444	ND mg/L	----	ND	50.0	140	----
		Chromium, TCLP	7440-47-3	E444	1.23 mg/L	1.25 mg/L	98.7	50.0	140	----
		Cobalt, TCLP	7440-48-4	E444	ND mg/L	----	ND	50.0	140	----
		Copper, TCLP	7440-50-8	E444	2.37 mg/L	2.5 mg/L	94.8	50.0	140	----
		Iron, TCLP	7439-89-6	E444	246 mg/L	250 mg/L	98.5	50.0	140	----
		Lead, TCLP	7439-92-1	E444	9.79 mg/L	10 mg/L	97.9	50.0	140	----
		Magnesium, TCLP	7439-95-4	E444	244 mg/L	250 mg/L	97.4	50.0	140	----
		Nickel, TCLP	7440-02-0	E444	2.46 mg/L	2.5 mg/L	98.3	50.0	140	----
		Selenium, TCLP	7782-49-2	E444	5.07 mg/L	5 mg/L	101	50.0	140	----
		Silver, TCLP	7440-22-4	E444	0.061 mg/L	0.1 mg/L	61.3	50.0	140	----
		Thallium, TCLP	7440-28-0	E444	4.8 mg/L	5 mg/L	95.8	50.0	140	----
		Uranium, TCLP	7440-61-1	E444	4.84 mg/L	5 mg/L	96.8	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	----	ND	50.0	140	----
		Zirconium, TCLP	7440-67-7	E444	0.9 mg/L	1 mg/L	87.7	50.0	150	----
TCLP Metals (QCLot: 1696650)										
VA24C5574-001	BA2438-A-1	Mercury, TCLP	7439-97-6	E512	0.0009 mg/L	0.001 mg/L	92.8	50.0	140	----



Reference Material (RM) Report

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

Sub-Matrix:

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: 1691741)									
QC-1691741-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	113	70.0	130	----
QC-1691741-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	97.8	70.0	130	----
QC-1691741-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	105	70.0	130	----
QC-1691741-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	99.2	70.0	130	----
QC-1691741-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	112	70.0	130	----
QC-1691741-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	93.0	70.0	130	----
QC-1691741-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	108	70.0	130	----
QC-1691741-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	109	70.0	130	----
QC-1691741-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	105	70.0	130	----
QC-1691741-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	102	70.0	130	----
QC-1691741-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	99.9	70.0	130	----
QC-1691741-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	106	70.0	130	----
QC-1691741-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	96.9	70.0	130	----
QC-1691741-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	121	70.0	130	----
QC-1691741-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	107	70.0	130	----
QC-1691741-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	100	70.0	130	----
QC-1691741-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	97.7	70.0	130	----
QC-1691741-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	103	70.0	130	----
QC-1691741-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	102	70.0	130	----
QC-1691741-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	106	70.0	130	----
QC-1691741-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	106	60.0	140	----
QC-1691741-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	98.2	70.0	130	----
QC-1691741-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	116	70.0	130	----
QC-1691741-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	101	70.0	130	----
QC-1691741-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	103	50.0	150	----
QC-1691741-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	98.2	70.0	130	----
QC-1691741-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	94.3	40.0	160	----
QC-1691741-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	111	70.0	130	----
QC-1691741-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	108	70.0	130	----
QC-1691741-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	108	70.0	130	----
QC-1691741-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	103	70.0	130	----
QC-1691741-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	103	70.0	130	----
QC-1691741-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	106	70.0	130	----



Sub-Matrix:

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: 1691742)									
QC-1691742-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	99.8	70.0	130	----
Metals (QCLot: 1692216)									
QC-1692216-003	MRCA-21	Aluminum	7429-90-5	E440	22500 mg/kg	115	70.0	130	----
QC-1692216-003	MRCA-21	Antimony	7440-36-0	E440	24.8 mg/kg	97.7	70.0	130	----
QC-1692216-003	MRCA-21	Arsenic	7440-38-2	E440	21.2 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Barium	7440-39-3	E440	788 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Beryllium	7440-41-7	E440	1.82 mg/kg	110	70.0	130	----
QC-1692216-003	MRCA-21	Bismuth	7440-69-9	E440	1.78 mg/kg	90.3	70.0	130	----
QC-1692216-003	MRCA-21	Cadmium	7440-43-9	E440	2.15 mg/kg	105	70.0	130	----
QC-1692216-003	MRCA-21	Calcium	7440-70-2	E440	4900 mg/kg	104	70.0	130	----
QC-1692216-003	MRCA-21	Chromium	7440-47-3	E440	56.9 mg/kg	105	70.0	130	----
QC-1692216-003	MRCA-21	Cobalt	7440-48-4	E440	32 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Copper	7440-50-8	E440	969 mg/kg	101	70.0	130	----
QC-1692216-003	MRCA-21	Iron	7439-89-6	E440	32700 mg/kg	106	70.0	130	----
QC-1692216-003	MRCA-21	Lead	7439-92-1	E440	919 mg/kg	101	70.0	130	----
QC-1692216-003	MRCA-21	Lithium	7439-93-2	E440	47.3 mg/kg	119	70.0	130	----
QC-1692216-003	MRCA-21	Magnesium	7439-95-4	E440	7780 mg/kg	107	70.0	130	----
QC-1692216-003	MRCA-21	Manganese	7439-96-5	E440	8640 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Molybdenum	7439-98-7	E440	25.1 mg/kg	97.4	70.0	130	----
QC-1692216-003	MRCA-21	Nickel	7440-02-0	E440	1000 mg/kg	104	70.0	130	----
QC-1692216-003	MRCA-21	Phosphorus	7723-14-0	E440	660 mg/kg	115	70.0	130	----
QC-1692216-003	MRCA-21	Potassium	7440-09-7	E440	10800 mg/kg	107	70.0	130	----
QC-1692216-003	MRCA-21	Selenium	7782-49-2	E440	1.04 mg/kg	94.8	60.0	140	----
QC-1692216-003	MRCA-21	Silver	7440-22-4	E440	8.98 mg/kg	96.7	70.0	130	----
QC-1692216-003	MRCA-21	Sodium	7440-23-5	E440	1770 mg/kg	115	70.0	130	----
QC-1692216-003	MRCA-21	Strontium	7440-24-6	E440	41 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Sulfur	7704-34-9	E440	3940 mg/kg	103	50.0	150	----
QC-1692216-003	MRCA-21	Thallium	7440-28-0	E440	0.907 mg/kg	102	70.0	130	----
QC-1692216-003	MRCA-21	Tin	7440-31-5	E440	3.79 mg/kg	99.8	40.0	160	----
QC-1692216-003	MRCA-21	Titanium	7440-32-6	E440	2790 mg/kg	110	70.0	130	----
QC-1692216-003	MRCA-21	Tungsten	7440-33-7	E440	6.99 mg/kg	110	70.0	130	----
QC-1692216-003	MRCA-21	Uranium	7440-61-1	E440	3.97 mg/kg	106	70.0	130	----
QC-1692216-003	MRCA-21	Vanadium	7440-62-2	E440	66.2 mg/kg	104	70.0	130	----
QC-1692216-003	MRCA-21	Zinc	7440-66-6	E440	828 mg/kg	98.9	70.0	130	----
QC-1692216-003	MRCA-21	Zirconium	7440-67-7	E440	6.91 mg/kg	126	70.0	130	----
Metals (QCLot: 1692217)									
QC-1692217-003	MRCA-21	Mercury	7439-97-6	E510	0.068 mg/kg	106	70.0	130	----





ALS Environmental

C5574

Chain of Custody / Analytical Request Form

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COC #

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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:	Nicole Victor / Dan Skrypnik	<input checked="" type="checkbox"/> PDF	<input type="checkbox"/> Excel	<input type="checkbox"/> Digital	<input type="checkbox"/> Fax
Address:	5150 Riverbend Drive Burnaby BC	Email 1:	nvictor@covanta.com		<input type="radio"/> Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Phone:	604-521-1025	Email 2:	rminchin@covanta.com		<input type="radio"/> Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
Fax:	<input type="checkbox"/> Yes <input type="checkbox"/> No	Email 3:	dskrypnik@covanta.com		<input type="radio"/> Same Day or Weekend Emergency - Contact ALS to Confirm TAT
				Analysis Request	
				brent.kirkpatrick@metrovancover.org	
				Sarah.Wellman@metrovancover.org	

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

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				
BA2438-A-1		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-2		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-3		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-4		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-5		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-6		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-7		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-8		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-9		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-10		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-11		18-Sep-24	9:00	Soil	X	X		X					1
BA2438-A-12		18-Sep-24	9:00	Soil	X	X		X					1

Environmental Division
Vancouver
Work Order Reference
VA24C5574



Telephone : +1 604 253 4198

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

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

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

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

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations:
<i>[Signature]</i>	26-9-24	0800	JL	26-9-24	1245p	18 °C	LP	9/26/24		Yes / No ? If Yes add SIF

NO SUPER
12309m
GENF 20.00 Front