

Date: 4/8/2022

To: File/Julia DeGagné**From:** Thomas Rhodes**Subject:** Source Test Review Report
Covanta Marion, Inc.
Permit No. 24-5398-TV-01Test Date: December 7, 2021
Report Received: January 31, 2022
Source Tester: Montrose Air Quality
DEQ Observed: Yes

I) Source Description: Covanta Marion, Inc. (CMI) owns and operates a Solid Waste-to-Energy Facility (Facility) in Brooks, Oregon. The primary objective of the CMI Facility is to provide for the disposal of solid waste. In order to achieve this primary objective the Facility receives, stores, and combusts solid waste as defined in Oregon Revised Statutes (ORS) 459.005 and the Facility's Solid Waste Permit. The combustible fraction of the solid waste is utilized to produce steam, which is in turn utilized in a turbine generator to produce electricity which is sold to the local utility. The Facility operates 24 hours per day, 365 days per year, except for periods of scheduled and unscheduled maintenance.

Additionally, CMI is authorized under the Solid Waste Permit to accept for disposal the following: a) cannery wastes; b) conditionally exempt small quantity generator hazardous wastes; c) narcotics, illicit drugs, and equipment and other materials used in the production of illicit drugs; d) pharmaceutical wastes such as prescription and over-the-counter drugs, and DEA-controlled substances; and e) infectious wastes.

II) Process (es)/Emissions Unit(s) Tested: Testing was conducted on the Unit 1 combustor. Target operating parameters for the test were:

Maximum steam load	≤ 90% of design or 60,000 lbs/hr
Minimum rate of Regulated Medical Waste (RMW)	1.5 tons/hr
Minimum rate of Liquid Direct Injection (LDI)	225 gallons/hr

III) Test Purpose: To evaluate emissions of Toxic Air Contaminants with acute health effects at a low steam production rate.

IV) Testing Location:

Unit 1 Stack:

Diameter:	48"
Distance A (Method 1):	1440" (30 Diameters)
Distance B (Method 1):	1200" (25 Diameters)
Number traverse points utilized:	12

V) Testing Methodology: The following testing methods were utilized during the testing program:

Exhaust Gas Flow Rate: EPA Methods 1-4
Hydrogen Chloride and Hydrogen Fluoride: Modified EPA Method 26A
Multi Metals: EPA Method 29

VI) Summary of Results: The test results and operating parameters are summarized in the Tables below:

Table 1: Hydrogen Chloride and Hydrogen Fluoride Emissions

Table 2: Multi Metal Emissions

TABLE 1: Hydrogen Chloride and Hydrogen Fluoride Emissions

Parameter	Run 1	Run 2	Average
Date	12/7/2021	12/7/2021	--
Test Times	13:37-14:37	16:05-17:05	--
Steam Load (lbs/hour)	60,700	55,300	58,000
Natural Gas (kscf/hr)	0.2	0.2	0.2
Lime flow (lbs/hr)	254	254	254
RMW (tons/hr)	1.3	0.69	1.0
RMW (% of total fuel)	12	8	10
LDI Rate (gals/hr)	199	139	169
Exhaust Gas Temperature (°F)	221	230	225
Exhaust Gas Moisture (%)	13.4	10.8	12.1
Exhaust O ₂ (% dry vol)	13.4	14.4	13.9
Exhaust CO ₂ (% dry vol)	6.3	5.4	5.9
Exhaust Gas Velocity (ft/m)	4,928	5,223	5,075
Exhaust Gas Flow Rate (dscf/m)	41,230	44,434	42,832
Sample Volume (dscf)	43.780	43.315	43.548
HCl Emissions:	--	--	--
· ug/dscm	5,244	8,653	6,948
· ppmv	3.5	5.7	4.6
· lb/hr	0.81	1.44	1.12
· lb/1000 lb steam	1.33E-02	2.60E-02	1.96E-02
HF Emissions:	--	--	--
· ug/dscm	< 17.8	< 18.4	< 18.1
· ppmv	< 0.02	< 0.02	< 0.02
· lb/hr	< 2.75E-03	< 3.06E-03	< 2.90E-03
· lb/1000 lb steam	< 4.50E-05	< 5.53E-05	< 5.02E-05

'<' denotes results calculated using the MDL for results that were non-detect

TABLE 2: Multi Metal Emissions

Parameter	Run 1	Run 2	Average
Date	12/7/2021	12/7/2021	--
Test Times	13:37-15:45	16:05-18:12	--
Steam Load (lbs/hr)	58,900	54,400	56,650
Natural Gas (kscf/hr)	0.2	0.2	0.2
Carbon Feed (lbs/hr)	9.5	9.5	9.5
RMW (tons/hr)	1.13	0.65	0.89
RMW (% of total fuel)	13	8	10.5
LDI Rate (gals/hr)	158	140	149
Exhaust Gas Flow Rate (dscfm)	42,009	44,973	43,491
Sample Volume (dscf)	75.337	78.853	77.10
Aluminum Emissions:	--	--	--
· ug/dscm	7.21E+01	4.98E+01	6.10E+01
· lb/hr	1.13E-02	8.39E-03	9.87E-03
· lb/1000 lb steam	1.93E-04	1.54E-04	1.73E-04
Antimony Emissions:	--	--	--
· ug/dscm	<1.53E-01	2.96E-01	< 2.25E-01
· lb/hr	<2.41E-05	4.99E-05	< 3.70E-05
· lb/1000 lb steam	<4.10E-07	9.17E-07	< 6.63E-07
Arsenic Emissions:	--	--	--
· ug/dscm	<2.45E-01	<3.23E-01	< 2.84E-01
· lb/hr	<3.86E-05	<5.43E-05	< 4.65E-05
· lb/1000 lb steam	<6.55E-07	<9.99E-07	< 8.27E-07
Barium Emissions:	--	--	--
· ug/dscm	9.33E-01	8.63E-01	8.98E-01
· lb/hr	1.47E-04	1.45E-04	1.46E-04
· lb/1000 lb steam	2.49E-06	2.67E-06	2.58E-06
Beryllium Emissions:	--	--	--
· ug/dscm	<2.86E-02	<2.74E-02	< 2.80E-02
· lb/hr	<4.51E-06	<4.62E-06	< 4.56E-06
· lb/1000 lb steam	<7.65E-08	<8.49E-08	< 8.07E-08
Cadmium Emissions:	--	--	--
· ug/dscm	6.17E-01	1.40E-01	3.78E-01
· lb/hr	9.70E-05	2.36E-05	6.03E-05
· lb/1000 lb steam	1.65E-06	4.34E-07	1.04E-06
Chromium Emissions:	--	--	--
· ug/dscm	4.30E+00	3.22E+00	3.76E+00
· lb/hr	6.76E-04	5.42E-04	6.09E-04
· lb/1000 lb steam	1.15E-05	9.96E-05	1.07E-05

TABLE 2: Multi Metal Emissions continued

Parameter	Run 1	Run 2	Average
Cobalt Emissions:	--	--	--
· ug/dscm	1.28E-01	1.11E-01	1.19E-01
· lb/hr	2.01E-05	1.87E-05	1.94E-05
· lb/1000 lb steam	3.42E-07	3.43E-07	3.43E-07
Copper Emissions:	--	--	--
· ug/dscm	7.86E-01	1.07E+00	9.28E-01
· lb/hr	1.24E-04	1.80E-04	1.52E-04
· lb/1000 lb steam	2.10E-06	3.31E-06	2.71E-06
Iron Emissions:	--	--	--
· ug/dscm	1.78E+02	1.34E+02	1.56E+02
· lb/hr	2.80E-02	2.25E-02	2.53E-02
· lb/1000 lb steam	4.75E-04	4.14E-04	4.45E-04
Lead Emissions:	--	--	--
· ug/dscm	5.39E-01	1.23E+00	8.85E-01
· lb/hr	8.48E-05	2.07E-04	1.46E-04
· lb/1000 lb steam	1.44E-06	3.81E-06	2.63E-06
Manganese Emissions:	--	--	--
· ug/dscm	2.34E+00	7.12E+00	4.73E+00
· lb/hr	3.68E-04	1.20E-03	7.83E-04
· lb/1000 lb steam	6.25E-06	2.20E-05	1.41E-05
Mercury Emissions:	--	--	--
· ug/dscm	< 8.49E-01	< 1.15E+00	< 9.99E-01
· lb/hr	< 1.34E-04	< 1.94E-04	< 1.64E-04
· lb/1000 lb steam	< 2.27E-06	< 3.56E-06	< 2.91E-06
Molybdenum Emissions:	--	--	--
· ug/dscm	< 1.43E+00	< 1.37E+00	< 1.40E+00
· lb/hr	< 2.25E-04	< 2.31E-04	< 2.28E-04
· lb/1000 lb steam	< 3.82E-06	< 4.24E-06	< 4.03E-06
Nickel Emissions:	--	--	--
· ug/dscm	2.64E+00	1.94E+00	2.29E+00
· lb/hr	4.15E-04	3.26E-04	3.71E-04
· lb/1000 lb steam	7.05E-06	5.99E-06	6.52E-06
Phosphorus Emissions:	--	--	--
· ug/dscm	2.60E+00	1.78E+00	2.19E+00
· lb/hr	4.09E-04	3.00E-04	3.54E-04
· lb/1000 lb steam	6.94E-06	5.52E-06	6.23E-06
Potassium Emissions:	--	--	--
· ug/dscm	3.70E+01	3.24E+01	3.47E+01
· lb/hr	5.83E-03	5.46E-03	5.64E-03
· lb/1000 lb steam	9.90E-05	1.00E-04	9.96E-05

TABLE 2: Multi Metal Emissions continued

Parameter	Run 1	Run 2	Average
Selenium Emissions:	--	--	--
· ug/dscm	<1.73E-01	<1.40E-01	< 1.56E-01
· lb/hr	<2.72E-05	<2.35E-05	< 2.54E-05
· lb/1000 lb steam	<4.62E-07	<4.33E-07	< 4.48E-07
Silver Emissions:	--	--	--
· ug/dscm	1.06E-01	6.87E-02	8.72E-02
· lb/hr	1.66E-05	1.16E-05	1.41E-05
· lb/1000 lb steam	2.82E-07	2.13E-07	2.47E-07
Thallium Emissions:	--	--	--
· ug/dscm	<5.21E-02	<4.98E-02	< 5.09E-02
· lb/hr	<8.19E-06	<8.39E-06	< 8.29E-06
· lb/1000 lb steam	<1.39E-07	<1.54E-07	< 1.47E-07
Vanadium Emissions:	--	--	--
· ug/dscm	<2.86E+00	<2.74E+00	< 2.80E+00
· lb/hr	<4.50E-04	<4.62E-04	< 4.56E-04
· lb/1000 lb steam	<7.65E-06	<8.49E-06	< 8.07E-06
Zinc Emissions:	--	--	--
· ug/dscm	9.98E+00	9.83E+00	9.90E+00
· lb/hr	1.57E-03	1.66E-03	1.61E-03
· lb/1000 lb steam	2.67E-05	3.04E-05	2.85E-05

'<' denotes results calculated using the MDL for front half and/or back half results that were non-detect.

VII) Concerns & Comments:

- 1) Only two test runs were completed due to leachate from the Marion County ash monofill becoming unavailable for delivery to the site. Leachate from the Marion County ash monofill was to be used for Liquid Direct Injection (LDI) during the testing. This was discussed while DEQ was onsite observing the source testing. The facility submitted an extension request to complete source testing by March 31, 2022, to ensure that sufficient leachate would be available to complete the source testing at the desired LDI rate.
- 2) Molybdenum speciation analysis on the Method 29 or the modified Method 26A particulate filters was not completed as proposed in the source test plan. Analysis could not be completed using the Method 29 filters due to potentially destructive analysis. Analysis was not completed using the modified Method 26A filters due to potential bias in the amount of particulate collected from non-isokinetic sampling.
- 3) The Method 29 front half reagent blank exceeded the allowable amount for aluminum, iron, and potassium. The maximum blank correction allowed by the method was used.
- 4) The Method 29 back half results for zinc were corrected using the wrong reagent blank value of 0.0976 ug (page 59). The lab report on page 127 shows the reagent blank value for zinc was 0.9758 ug. The results in Table 2 above were corrected for the correct zinc reagent blank value.
- 5) The amount of LDI during the test runs was less than the proposed minimum rate of 225 gallons/hour in the approved source test plan.
- 6) The amount of Regulated Medical Waste (RMW) burned during the test runs was less than the proposed minimum rate of 1.5 tons/hour in the approved source test plan.
- 7) Hydrogen fluoride, beryllium, thallium, and vanadium were non-detect in all sample fractions and all test runs.

VIII) Overall Evaluation: As noted above, testing was not successfully completed for all of the conditions and operating parameters approved in the source test plan. The test methods conducted, and the data provided are sufficient to evaluate emissions of HCl, HF, and metals from the facility only at the operating conditions tested. Use of this data in a Cleaner Air Oregon risk assessment may result in source risk limits, as applicable, based on the conditions and operating parameters demonstrated during this source test.

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