

EMISSIONS TESTING REPORT 14016
Text and Appendices

PERFORMED FOR:

COVANTA ENERGY GROUP, INC.
Morristown, New Jersey

at the

Kent County Waste to Energy Facility
Grand Rapids, Michigan
Units 1 and 2 SDA Inlets and Stacks
June 2014

by

TESTAR Engineering, P.C.
7424-108 ACC Boulevard
Raleigh, North Carolina 27617
License Number C-3896
919/957-9500

RECEIVED

MAR 20 2015

AIR QUALITY DIV.

1.0 INTRODUCTION

1.1 General

Covanta Energy Group, Inc. (Covanta) operates the Kent County Waste-to-Energy Facility in Grand Rapids, Michigan. Covanta contracted TESTAR Engineering, P. C. to conduct an air emissions testing program to quantify specific emissions from Units 1 and 2 for determining compliance status. The testing program was conducted between June 23 and 27, 2014 by TESTAR Engineering under the supervision of Mr. Dan Miesse of Covanta Energy Group, Inc.

1.2 Test Personnel

Table 1-1 presents the personnel that were involved in the testing program.

**Table 1-1
Test Personnel**

Affiliation	Personnel Responsibility
Covanta Energy Group, Inc.	Dan Miesse Test Coordinator
Covanta Kent, Inc.	Terry Madden Test Coordinator
Michigan Department of Environmental Quality	David Patterson Test Observer
	Nathan Hude Test Observer
TESTAR Engineering, P.C.	Chris Wrenn Project Director
	Blake Cone Field Laboratory Manager
	Phil Juneau CEM Test Engineer
	Jeff Aims Test Engineer
	Will Snipes Test Engineer
	Charles Nahrebecki Test Engineer
	Matt Winkeler Test Engineer

RECEIVED
MAR 20 2015
AIR QUALITY DIV.

1.3 Test Parameters and Run Numbers

Tables 1-2 and 1-3 present the test dates, sampling locations, flue gas parameters, sampling methods, and run numbers for reference.

Table 1-2
 Unit 1 and Ash System Test Sequence

Test Location	Sampling Method	Flue Gas Parameter	Run Date	Run Time	Run Number
Ash Handling System	EPA M22	Fugitive Emissions	06/24/14	1120-1230	M22-1
			06/25/14	1410-1520	M22-2
			06/26/14	1130-1240	M22-3
Unit 1 SDA Inlet	EPA MM26	Hydrogen Chloride	06/24/14	0816-0916	1-I-MM26-1
			06/24/14	0936-1036	1-I-MM26-2
			06/25/14	0908-1008	1-I-MM26-3
	EPA M29	Mercury	06/24/14	0815-1022	1-I-M29-1
			06/25/14	0907-1114	1-I-M29-2
			06/25/14	1405-1610	1-I-M29-3
Unit 1 Stack	EPA MM26	Hydrogen Chloride	06/24/14	0816-0916	1-S-MM26-1
			06/24/14	0936-1036	1-S-MM26-2
			06/25/14	0908-1008	1-S-MM26-3
	EPA M29	Particulate and Metals	06/24/14	0815-1022	1-S-M29-1
			06/25/14	0907-1114	1-S-M29-2
			06/25/14	1405-1610	1-S-M29-3
Facility COMS	Opacity	06/24/14	0900-1000	1-S-COM-1	
		06/25/14	1000-1100	1-S-COM-2	
		06/25/14	1500-1600	1-S-COM-3	

**Table 1-3
 Unit 2 Test Sequence**

Test Location	Sampling Method	Flue Gas Parameter	Run Date	Run Time	Run Number
Unit 2 SDA Inlet	EPA MM26	Hydrogen Chloride	06/23/14	0907-1016	2-I-MM26-1
			06/23/14	1036-1136	2-I-MM26-2
			06/23/14	1225-1325	2-I-MM26-3
	EPA M29	Mercury	06/23/14	0906-1132	2-I-M29-1
			06/23/14	1224-1432	2-I-M29-2
			06/23/14	1511-1728	2-I-M29-3
Unit 2 Stack	EPA M23	Dioxins/Furans	06/26/14	1055-1500	2-S-M23-1
			06/27/14	0730-1135	2-S-M23-2
			06/27/14	1150-1555	2-S-M23-3
	EPA MM26	Hydrogen Chloride	06/23/14	0907-1016	2-S-MM26-1
			06/23/14	1036-1136	2-S-MM26-2
			06/23/14	1225-1325	2-S-MM26-3
	EPA M29	Particulate and Metals	06/23/14	0906-1132	2-S-M29-1
			06/23/14	1224-1432	2-S-M29-2
			06/23/14	1511-1727	2-S-M29-3
	EPA M8	Sulfuric Acid Mist	06/24/14	1112-1214	2-S-M8-1
			06/24/14	1310-1418	2-S-M8-2
			06/24/14	1458-1640	2-S-M8-3
	EPA M13B and CARB M425	Total Fluorides and Hexavalent Chromium	06/23/14	0906-1132	2-S-M13B/425-1
			06/23/14	1224-1432	2-S-M13B/425-2
			06/23/14	1511-1727	2-S-M13B/425-3
EPA M25A	Total Hydrocarbons	06/24/14	1112-1212	2-S-M25A-1	
		06/24/14	1310-1410	2-S-M25A-2	
		06/24/14	1814-1914	2-S-M25A-3	
Facility COMS	Opacity	06/23/14	1000-1100	2-S-COM-1	
		06/23/14	1300-1400	2-S-COM-2	
		06/23/14	1600-1700	2-S-COM-3	

Table 1-4
 Utilization of EPA Method 2 and 3 Data

Runs Requiring Additional Information	Runs Providing Air Flow Rate Data	Runs Providing Flue Gas Composition Data
1-I-MM26-1	NA	1-I-M29-1
1-I-MM26-2	NA	1-I-M29-1
1-I-MM26-3	NA	1-I-M29-2
1-S-MM26-1	1-S-M29-1	1-S-M29-1
1-S-MM26-2	1-S-M29-1	1-S-M29-1
1-S-MM26-3	1-S-M29-2	1-S-M29-2
2-I-MM26-1	NA	2-I-M29-1
2-I-MM26-2	NA	2-I-M29-1
2-I-MM26-3	NA	2-I-M29-2
2-S-MM26-1	2-S-M29-1	2-S-M29-1
2-S-MM26-2	2-S-M29-1	2-S-M29-1
2-S-MM26-3	2-S-M29-2	2-S-M29-2
2-S-M13B/425-1	2-S-M13B/425-1	2-S-M29-1
2-S-M13B/425-2	2-S-M13B/425-2	2-S-M29-2
2-S-M13B/425-3	2-S-M13B/425-3	2-S-M29-3
2-S-CEM-3	2-S-M8-1	2-S-CEM-3
2-S-CEM-5	2-S-M8-2	2-S-CEM-5
2-S-CEM-11	2-S-M2/4-1	2-S-CEM-11

2.0 SUMMARY OF RESULTS

2.1 Report Organization

The results of the testing project are summarized in Section 2. The process tested is discussed in Section 3. The sampling and analytical methods utilized are discussed in Section 4 while the Quality Assurance/Quality Control results are presented in Section 5. Appendix A contains detailed results of the testing program. Appendix B contains the field data that was collected and Appendix C contains the analytical results. Appendix D contains all pertinent testing equipment calibration data. Refer to the Table of Contents and the List of Tables and Figures for a complete reference with appropriate page numbers.

2.2 Presentation of Results

Table 2-1 presents the results of the emissions testing project for Unit 1. Table 2-2 presents the results of the emissions testing project for Unit 2. A more detailed summary of the sampling gas parameters is presented in Appendix A.

2.3 Total Hydrocarbon Results

Methane samples were not collected and analyzed because the onsite real-time total hydrocarbon results were significantly below the permitted limit for total non-methane hydrocarbons. This procedure was approved by Mr. Daryll Fickling and Mr. Terry Madden for previous testing programs. This report presents total hydrocarbons as carbon for comparison to the total non-methane hydrocarbons permit limit.

2.4 Opacity and Fugitive Emissions Results

Opacity measurements were taken on each unit utilizing the facility COMS in accordance with 40CFR60.11(e)(5) during each particulate test. Additionally, three EPA Method 22 test runs were performed for fugitive emissions on the ash handling system. No fugitive emissions results are presented in Appendix A because all values were zero. The field data sheets are located in Appendix B.14.

2.5 Dioxins/Furans Results and EMPC Values

In accordance with EPA Method 23, Section 9.9, all dioxins/furans results that were below the minimum detection limit (ND) were treated as zero when averaging or totaling the results. All dioxins/furans results that were an estimated maximum possible concentration (EMPC) are presented using the EMPC value as a positive catch when calculating the results.

**Table 2-1
Summary of Emissions
Unit 1 Annual Compliance Testing**

Parameter	Rep. 1	Rep. 2	Rep. 3	Average	Permit Limit
Unit 1 SDA Inlet Concentrations @ 7% O₂					
Hydrogen Chloride, ppmvd	743	985	772	833	NA
Mercury, ug/DSCM	92.3	67.4	44.8	68.2	NA
Unit 1 Stack Emissions Rates, lb/hr					
Metals					
Cadmium	1.24E-04	1.34E-04	1.17E-04	1.25E-04	4.17E-03
Lead	0.00167	0.00148	0.00211	0.00175	0.10
Mercury	0.000109	0.0000889	0.0000870	0.0000951	0.07
Particulate	0.978	0.509	0.339	0.609	2.6
Unit 1 Stack Concentrations @ 7% O₂					
Hydrogen Chloride, ppmvd	15.9	16.8	22.4	18.3	29
Metals					
Cadmium, ug/DSCM	1.10	1.19	1.10	1.13	37
Lead, mg/DSCM	0.0148	0.0131	0.0200	0.0160	0.87
Mercury, mg/DSCM	0.000973	0.000786	0.000825	0.000861	0.61
Opacity by Facility COMS, %	0.0	0.0	0.0	0.0	10
Particulate, gr/DSCF	0.00380	0.00197	0.00140	0.00239	0.010
Unit 1 Removal Efficiency, %					
HCl Removal Efficiency, ppmvd	97.9	98.3	97.1	97.8	≥ 95%

**Table 2-2
 Summary of Emissions
 Unit 1 Subpart Cb Testing**

Parameter	Rep. 1	Rep. 2	Rep. 3	Average	Permit Limit
Unit 1 SDA Inlet Concentrations @ 7% O₂					
Hydrogen Chloride, ppmvd	743	985	772	833	NA
Mercury, ug/DSCM	92.3	67.4	44.8	68.2	NA
Unit 1 Stack Concentrations @ 7% O₂					
Cadmium, ug/DSCM	1.10	1.19	1.10	1.13	35
Hydrogen Chloride, ppmvd	15.9	16.8	22.4	18.3	29
Lead, mg/DSCM	0.0148	0.0131	0.0200	0.0160	0.40
Mercury, mg/DSCM	0.000973	0.000786	0.000825	0.000861	0.050
Particulate, mg/DSCM	8.70	4.50	3.21	5.47	25
Unit 1 RE%, @ 7% O₂					
HCl Removal Efficiency, ppmvd	97.9	98.3	97.1	97.8	≥ 95%
Hg Removal Efficiency, mg/DSCM	98.9	98.8	98.2	98.6	≥ 85%

RECEIVED

MAR 20 2015

Table 2-3
Summary of Emissions
Unit 2 Annual Compliance Testing

AIR QUALITY DIV.

Parameter	Rep. 1	Rep. 2	Rep. 3	Average	Permit Limit
Unit 2 SDA Inlet Concentrations @ 7% O₂					
Hydrogen Chloride, ppmvd	577	589	752	639	NA
Mercury, ug/DSCM	107	76.6	94.7	92.7	NA
Unit 2 Stack Emissions Rates, lb/hr					
Carbon Monoxide – 1 hour	6.78	2.75	9.16	6.23	26.05
Carbon Monoxide – 8 hour	1.08	5.24	2.35	2.89	6.51
Dioxins/Furans, 1985 US EPA TEF	9.62E-10	1.95E-09	1.26E-09	1.39E-09	3.38E-07
Hexavalent Chromium	<1.17E-05	<1.12E-05	<1.11E-05	<1.13E-05	4.69E-04
Metals					
Arsenic	9.48E-05	2.85E-05	4.06E-05	5.46E-05	7.0E-04
Beryllium	<3.63E-06	<3.41E-06	<3.62E-06	<3.56E-06	1.83E-05
Cadmium	6.31E-05	9.96E-05	7.39E-05	7.89E-05	4.17E-03
Chromium	2.19E-04	2.06E-04	1.72E-04	1.99E-04	NA
Lead	0.00120	0.000636	0.000787	0.000876	0.10
Mercury	0.000104	0.0000945	0.000110	0.000103	0.07
Nitrogen Oxides – 1 hour	42.4	43.3	42.4	42.7	86
Nitrogen Oxides – 3 hour	42.7	43.3	42.5	42.8	75.25
Particulate	0.0945	0.143	0.232	0.157	2.6
Sulfur Dioxide – 8 hour	1.65	1.24	2.48	1.79	15
Sulfuric Acid Mist (IC)	< 0.00537	< 0.00496	< 0.00432	< 0.00488	4.4
Total Fluorides as HF	<0.00750	<0.00710	<0.00751	<0.00737	0.28
Total Hydrocarbons as CH ₄	0.237	0.118	0.103	0.152	0.94
Unit 2 Stack Concentrations @ 7% O₂					
Dioxins/Furans, ng/DSCM (1985 US EPA TEF)	0.00864	0.0162	0.0105	0.0118	3.0
Hexavalent Chromium, ug/DSCM	< 0.0957	< 0.0885	< 0.0869	< 0.0904	4.2
Hydrogen Chloride, ppmvd	9.10	8.13	10.4	9.20	29
Metals					
Arsenic, ug/DSCM	0.783	0.231	0.330	0.448	6.2
Beryllium, ug/DSCM	< 0.0300	< 0.0277	< 0.0295	< 0.0290	0.16
Cadmium, ug/DSCM	0.521	0.808	0.601	0.643	37
Chromium, ug/DSCM	1.81	1.67	1.40	1.63	NA
Lead, mg/DSCM	0.00994	0.00516	0.00640	0.00717	0.87
Mercury, mg/DSCM	0.000855	0.000767	0.000895	0.000839	0.61
Opacity by Facility COMS, %	0	0	0	0	10
Particulate, gr/DSCF	0.000341	0.000508	0.000824	0.000558	0.010
Sulfuric Acid Mist, mg/DSCM (IC)	< 0.0464	< 0.0414	< 0.0385	< 0.0421	39
Total Fluorides as HF, mg/DSCM	< 0.0614	< 0.0560	< 0.0587	< 0.0587	2.5
Total Hydrocarbons as CH ₄ , mg/DSCM	2.02	1.00	0.868	1.29	8.3
Unit 2 Stack Concentrations, ppmvd @ 7% O₂					
Carbon Monoxide – 1 hour	50	20	67	46	200
Carbon Monoxide – 4 hour	46	30	18	31	100
Carbon Monoxide – 8 hour	9	38	18	22	50
Nitrogen Oxides – 1 hour	190	189	188	189	400
Nitrogen Oxides – 3 hour	189	190	190	190	350
Sulfur Dioxide – 8 hour	5	3	8	5	50
Unit 2 Removal Efficiency, %					
HCl Removal Efficiency, ppmvd	98.4	98.6	98.6	98.6	≥ 95%
Sulfur Dioxide – 8 hour	80.0	83.7	78.1	80.6	≥ 75%

Table 2-4
 Summary of Emissions
 Unit 2 Subpart Cb Testing

Parameter	Rep. 1	Rep. 2	Rep. 3	Average	Permit Limit
Unit 2 SDA Inlet Concentrations @ 7% O₂					
Hydrogen Chloride, ppmvd	577	589	752	639	NA
Mercury, ug/DSCM	107	76.6	94.7	92.7	NA
Unit 2 Stack Concentrations @ 7% O₂					
Cadmium, ug/DSCM	0.521	0.808	0.601	0.643	35
Dioxins/Furans, ng/DSCM	1.70	2.07	1.75	1.84	30
Hydrogen Chloride, ppmvd	9.10	8.13	10.4	9.20	29
Lead, mg/DSCM	0.00994	0.00516	0.00640	0.00717	0.40
Mercury, mg/DSCM	0.000855	0.000767	0.000895	0.000839	0.050
Particulate, mg/DSCM	0.780	1.16	1.88	1.28	25
Unit 2 RE%, @ 7% O₂					
HCl Removal Efficiency, ppmvd	98.4	98.6	98.6	98.6	≥ 95%
Hg Removal Efficiency, mg/DSCM	99.2	99.0	99.1	99.1	≥ 85%

2.6 CEM Parameters

The facility CEMS and air flow rates measured during the metals testing were utilized for the sulfur dioxide, nitrogen oxides, and carbon monoxide emission rates for Unit 2.

2.7 Metals Reagent Blank Corrections

Chromium and lead were detected at low levels in the reagent blank. In accordance with EPA Method 29, Sections 12.6 and 12.7, the test run catch weights were corrected for the lead blank values.

2.8 Sulfuric Acid Mist Results

The EPA Method 8 samples for sulfuric acid mist were analyzed using the Thorin titration as specified in EPA Method 8 and by Ion Chromatography techniques. Ion chromatography is more accurate because it avoids interferences that are inherent in the titration procedure. Mr. Gary McAlister of the USEPA has stated his "technical opinion that analyzing EPA Method 8 samples for sulfuric acid mist by IC is as accurate as analyzing the samples by the Thorin titrations as specified in EPA Method 8". Ion chromatography results were utilized for subsequent calculations in this report. The results of both analytical techniques are presented in Appendix C.

2.9 Non-detected Values

The results are presented using a worst-case scenario. All non-detected results were used as values for calculation purposes and the result is preceded by a "<" symbol. All non-detected results were used as a zero when calculating total catch weights for samples that had both a positive catch weight for one or more fractions and also non-detected fraction(s). When averaging across a set of three test runs, non-detected results were treated as values. Any average result that includes a non-detected value includes a "<" symbol in front of the result.

2.10 Duplicate Analyses

Run 2 for each unit was analyzed in duplicate for the metals of interest. All runs for mercury were analyzed in duplicate. All runs for HCl were analyzed in duplicate. The average of the duplicate analyses were used for reporting purposes.

2.11 Performance Audit Samples

One mercury audit (061614BB, Cat No. 1428), two metals (As, Be, Cd, Cr, Pb) audits (061614BB, Cat No. 1425 and 061614BB, Cat No. 1426), one fluoride audit (061614BB, Cat No. 1441), one sulfate audit (061614AA, Cat No. 1444), and one hydrogen chloride audit (061614AA, Cat

No. 1440) were obtained from ERA. The results are summarized in Table 5-2 in Section 5 and complete results can be found in Appendix C.6.

The sulfate audit was unacceptable originally (1.7% above the acceptable range) and was reanalyzed with an acceptable result. The sulfate samples were reanalyzed along with the audit. Both audit results are presented in Table 5-2. Both sets of emissions results are included in Appendix A.10 and both sets of analytical results are presented in Appendix D.4.

3.0 PROCESS DESCRIPTION AND OPERATION

The Kent County Waste-to-Energy Facility processes up to 625 tons of solid waste each day, generating up to 18 megawatts of electricity or up to 116,000 lbs per hour exported steam. The facility was designed and built and is operated by Covanta of Kent, Inc. Each of the two (2) Martin GmbH waterwall furnaces processes up to 312.5 tons of waste per day. Waste is combusted at furnace temperatures exceeding 1,800 degrees Fahrenheit and reduced to an inert ash residue. Before leaving the facility, combustion air is directed through technologically advanced air pollution control equipment consisting of spray dryer absorbers (SDA) and fabric filter baghouses. The effluent entering the equipment is treated by the carbon and ammonia injection systems.

4.0 SAMPLING AND ANALYTICAL METHODS

This section briefly describes the sampling and analytical procedures that were used and any deviations from the methods. Figure 4-1 depicts a cross-section of the SDA Inlet test locations. Figure 4-2 depicts a cross-section of the Stack test locations.

4.1 EPA Methods 1-4 – Air Flow Rate and Moisture

EPA Methods 1 through 4 were utilized in conjunction with each isokinetic test method. EPA Method 1 was used to determine the location of the sampling points. EPA Method 2 was used to measure the flue gas flow rate. EPA Method 3 was used to determine the flue gas molecular weight. EPA Method 4 was used to determine the flue gas moisture content. The information provided by these methods was used in determining isokinetics, parameter concentrations, and parameter emission rates.

4.2 EPA Method 8 – Sulfuric Acid Mist

Sulfuric acid mist concentrations and emission rates were determined utilizing EPA Method 8. The EPA Method 8 sampling train consisted of a glass nozzle, a heated glass probe, a heated glass mat filter, one chilled impinger with 100mL of 80% IPA, an unheated glass mat filter, two chilled impingers each with 100mL of 3% H₂O₂, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 8 with no exceptions.

At the end of each test run, the contents of the IPA impinger were poured back into the original IPA reagent jar. The contents of the H₂O₂ impingers were poured back into the original H₂O₂ reagent jar. The silica gel was returned to its original container. The moisture catch in the components was then determined gravimetrically. The nozzle, probe, and filter fronthalf were rinsed with IPA into a sample jar. The heated filter was placed into this sample jar. The filter backhalf, IPA impinger, fronthalf of the second filter, connecting glassware, and the second filter itself were rinsed with DI water into the IPA reagent jar. The backhalf of the second filter, the H₂O₂ impingers, and connecting glassware were rinsed with DI water into the H₂O₂ reagent jar.

The fronthalf portion of the samples was analyzed in accordance with EPA Method 8 for sulfate as sulfuric acid mist using the Thorin titration as specified in EPA Method 8 and by Ion Chromatography techniques. Ion chromatography results were utilized for subsequent calculations in this report.

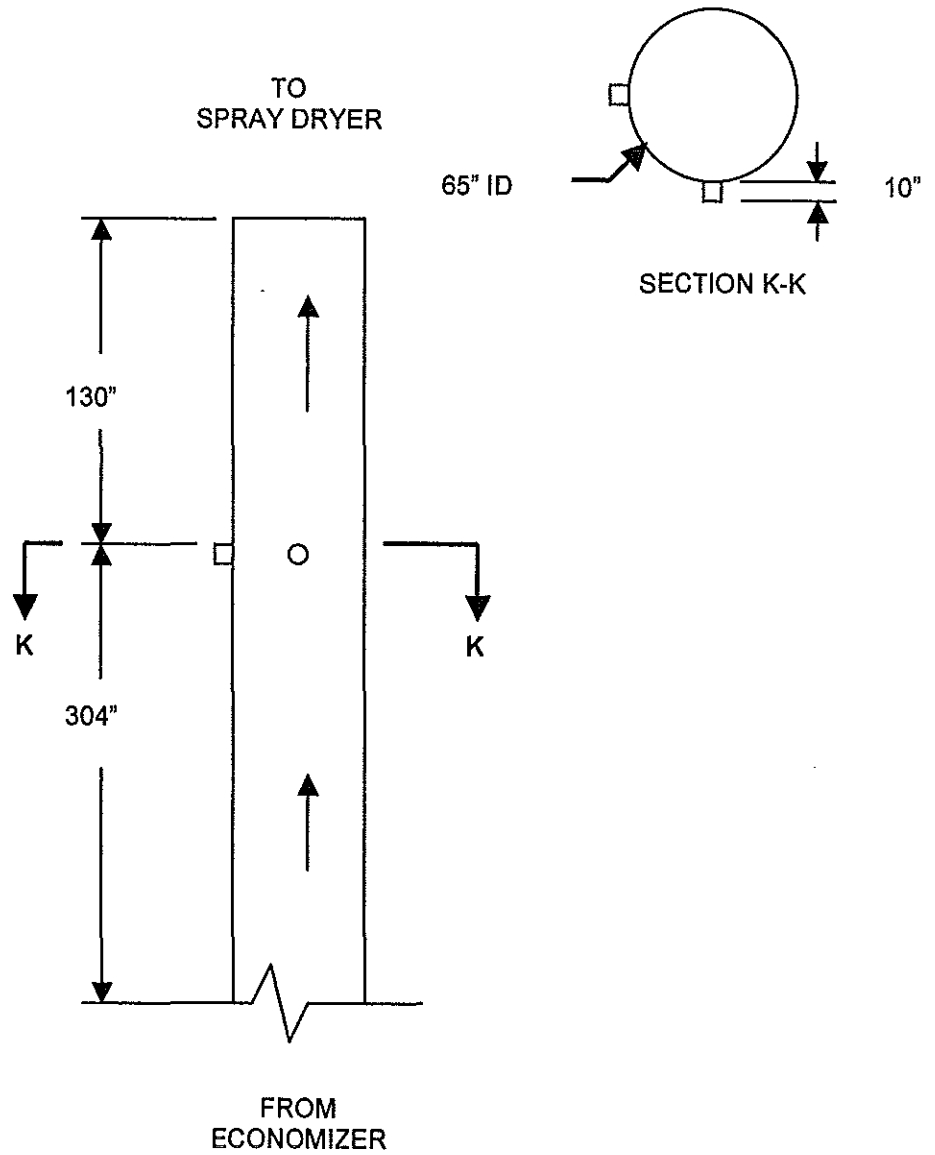


Figure 4-1. SDA Inlet Sampling Location
(Units 1 & 2 are identical)

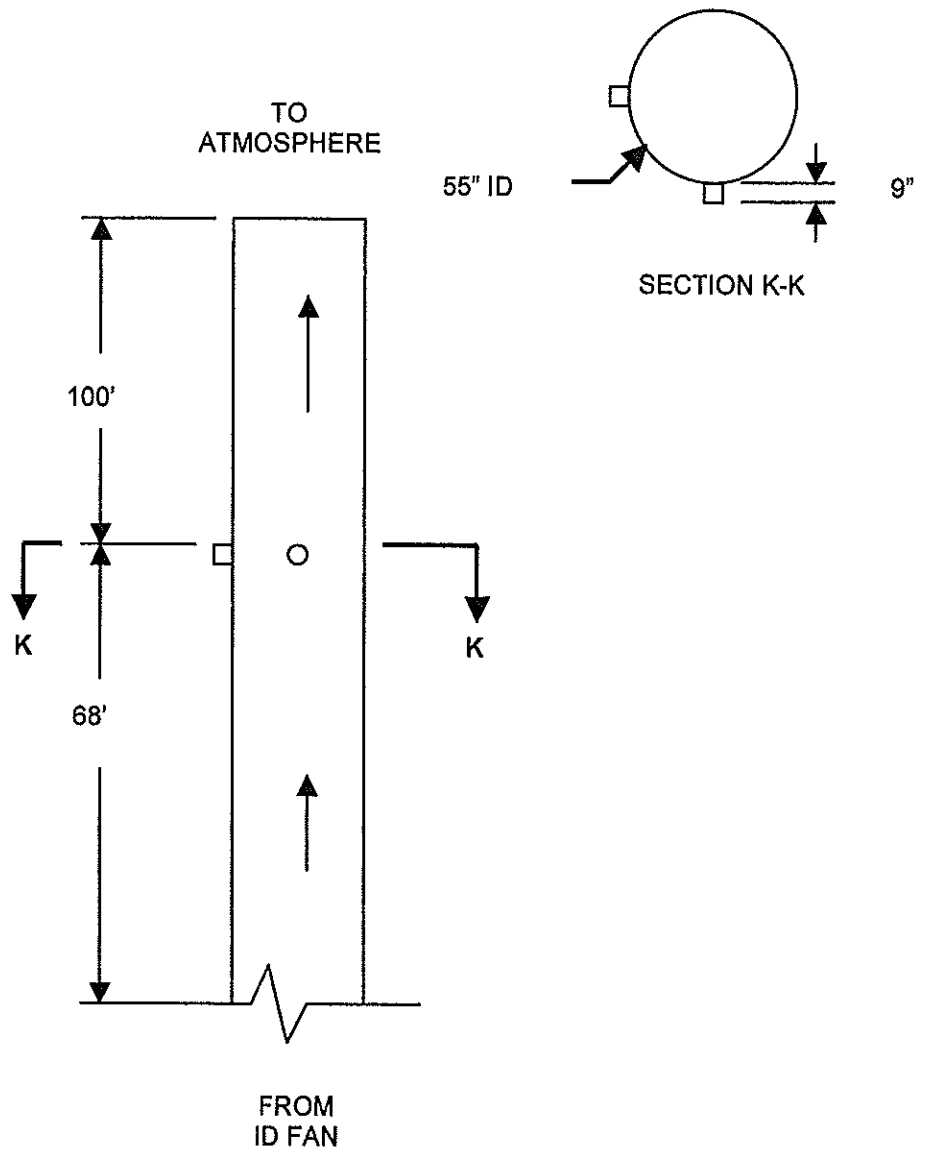


Figure 4-2. Stack Sampling Location
(Units 1 & 2 are identical)

4.3 EPA Method 13B and CARB Method 425 – Total Fluorides and Hexavalent Chromium

Total fluorides as hydrogen fluoride and hexavalent chromium concentrations and emission rates were determined utilizing a combined EPA Method 13B and CARB Method 425 sampling train. The sampling train consisted of a glass nozzle, a heated glass probe, a heated Whatman 541 filter, two chilled impingers each with 100mL of 0.5N NaOH, an empty impinger, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 13B and CARB Method 425 with no exceptions.

At the end of each test run, the contents of the first three impingers were poured back into the original reagent jar. The moisture catch was then determined gravimetrically. The nozzle, probe, filter holder, impingers, and connecting glassware were rinsed with DI into the sample jar. The filter was placed into the sample jar.

The samples were analyzed in accordance with EPA Method 13B for total fluorides as hydrogen fluoride. The samples were analyzed in accordance with CARB Method 425 for hexavalent chromium.

4.4 EPA Method 22 – Fugitive Emissions

The accumulated emissions time of fugitive emissions was determined by observing the process area(s) during normal operations for a pre-determined observation period (one hour). This method does not require that the opacity of emissions be determined, but rather the length of time that any fugitive emissions are visible. Fugitive emissions include emissions that escape capture by exhaust hoods, that are emitted during material transfer, that are emitted from buildings housing material processing or handling equipment, or that are emitted directly from process equipment. If any fugitive emissions are observed during the observation period, the length of time that the emissions are visible is quantified using a stopwatch. This total accumulated time of fugitive emissions is then used to determine compliance with the subpart or permit.

4.5 EPA Method 23/Alternate Method 052 – Dioxins/Furans

The concentrations and emissions rates of polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDD/PCDF or dioxins/furans) were determined utilizing EPA Method 23. The EPA Method 23 sampling train consisted of a glass nozzle, a heated glass probe, a heated glassmat filter, a condenser, an XAD resin trap, an empty impinger, two chilled impingers each with 100mL of DI water, an empty impinger, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 23 with no exceptions.

At the end of each test run, the nozzle, probe, and filter fronthalf were rinsed with acetone into a sample jar. The filter was recovered dry into a glass petri dish. The filter backhalf, and condenser were rinsed with acetone into a sample jar. All of the components listed above up to the XAD resin trap were rinsed again with toluene into a sample jar. The XAD resin trap was sealed and placed into a chilled ice chest. The contents of the first three impingers were poured back into the original reagent jar. The silica gel was poured back into its original container. The moisture catch was then determined gravimetrically.

The samples were analyzed in accordance with EPA Method 23 for dioxins/furans.

4.6 EPA Method 26 (Modified) –Hydrogen Chloride

Hydrogen chloride concentrations and emission rates were determined utilizing EPA Method 26 modified to use large impingers. The EPA Method 26 sampling train consisted of a heated glass probe, a heated quartz filter, two chilled impingers each with 100mL of 0.1N H₂SO₄, two chilled impingers each with 100mL of DI water, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 26 except that large impingers were used for sample collection.

At the end of each test run, the contents of the H₂SO₄ impingers were poured back into the original H₂SO₄ reagent jar. The contents of the DI impingers were poured back into the original DI reagent jar. The silica gel was returned to its original container. The moisture catch in the components was determined gravimetrically. The filter backhalf and H₂SO₄ impingers were rinsed with DI water into the H₂SO₄ reagent jar.

The H₂SO₄ portion of the samples were analyzed in accordance with EPA Method 26 for hydrogen chloride.

4.7 EPA Method 29 – Particulate and Metals

Particulate, mercury, and metals concentrations and emission rates were determined utilizing EPA Method 29. The EPA Method 29 sampling train consisted of a glass nozzle, a heated glass probe, a heated tared quartz filter,, two chilled impingers each with 100mL of 5%HNO₃/10%H₂O₂, an empty impinger, two chilled impingers each with 100mL of 4%KMnO₄/10%H₂SO₄, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 29 with no exceptions.

At the end of each test run, the nozzle, probe, and filter fronthalf were rinsed with acetone into a sample bottle. The nozzle, probe, and filter fronthalf were rinsed again with 100 mL of 0.1N nitric acid into a sample jar. The filter was recovered dry into another sample bottle. The contents of the 5%HNO₃/10%H₂O₂ impingers were poured back into the original reagent jar. Any condensate in

the empty impinger was poured into a sample bottle. The 4%KMnO₄/10%H₂SO₄ impingers were recovered into another sample jar.

The moisture catch was then determined gravimetrically. The filter backhalf and 5%HNO₃/10%H₂O₂ impingers were rinsed with 100 mL of 0.1N nitric acid into the reagent jar. The empty impinger was rinsed with 100 mL of 0.1N nitric acid into a sample jar. The 4%KMnO₄/10%H₂SO₄ impingers were rinsed with 100 mL of 4%KMnO₄/10%H₂SO₄ and 100 mL of DI water into the jar containing the 4%KMnO₄/10%H₂SO₄ reagent. The 4%KMnO₄/10%H₂SO₄ impingers and connecting glassware were rinsed with 25mL of 8N HCl if any brown residue remained. This HCl rinse was added to a jar containing 200mL of DI water.

The filter and acetone rinses were desiccated and analyzed gravimetrically following EPA Method 5 techniques. The samples were analyzed in accordance with EPA Method 29 for metals.

5.0 QA/QC RESULTS

5.1 QA/QC Policy Procedures

TESTAR Engineering, P. C. is committed to adhering to Quality Assurance/Quality Control (QA/QC) procedures and objectives that meet or exceed the relevant EPA guidance. Our procedures include calibration of equipment as appropriate, proper glassware pre-cleaning to prevent contamination of samples, proper sample recovery, documented sample custody, blank samples, duplicate analyses, matrix spike recovery, and validated computer generated results. We also adhere to other method specific criteria such as maintaining isokinetic conditions during particulate type testing and posttest leak checks.

TESTAR Engineering uses oil manometers to determine velocity differential pressures thus eliminating potential errors from magnehelic gauges. The manometers are leveled and zeroed prior to taking any measurements. All equipment used onsite undergoes a pretest audit and operational check for accuracy. Dry gas meters are checked by using an orifice to determine the meter gamma. The audit gamma must be within 3% of the full test gamma for the meter to be acceptable. Likewise, all thermocouples are checked at ambient temperature versus an ASTM reference thermometer or a thermometer that has been checked against an ASTM reference thermometer. The reading must agree within 2°F. Additionally, the barometer is checked against a reference barometer prior to each project and must agree within 0.1" Hg.

After each testing project, the dry gas meter undergoes a posttest audit following the guidelines of Alternate Method 009. Alternate Method 009 utilizes a mathematical calculation to check the dry gas meter calibration factor (gamma) versus the full test calibration factor. The gamma must agree within ±5% of the full test gamma.

5.2 Sample Custody and Preservation

Proper sample custody and preservation techniques ensure that the samples collected and analyzed are the same, that the sample did not change in concentration prior to analysis, and that the sample was not tampered with prior to analysis. To ensure accurate results, TESTAR Engineering collects and transports samples in clean containers that are inert to the matrix enclosed, that will not contaminate the sample, and that prevent photochemical reactions when appropriate. All samples contain unique identifiers that include the client name, facility name, project number, collection date, unique run number, sample fraction, and matrix. Liquid levels are marked in order to determine if any leakage occurred during transport. Samples are accompanied by sample custody forms identifying the client, facility, project number, sample, fractions, collection date, etc. When custody is relinquished to the laboratory, the receiving sample custodian signs the form.

5.3 Sample Blanks, Duplicates, and Matrix Spikes

Several types of blanks are utilized depending upon the project QA objectives. Typical blanks include field blanks, reagent blanks, and trip blanks. Blanks help to identify the source of contamination if contamination is suspected based upon the result validation procedure. Trip blanks are typically not analyzed unless the field blank shows significant contamination. Field blanks and reagent blanks are analyzed during most testing programs involving metals unless requested not to do so by the client. Field blanks are analyzed during most programs involving organics such as dioxins/furans.

Duplicates and matrix spikes are analyzed for projects involving metals testing. At least 10% of the samples are analyzed in duplicate for metals and at least one matrix spike is performed. All mercury analyses are performed in duplicate.

Breakthrough analyses are performed for projects involving organics utilizing adsorbent tubes. Adsorbent tubes are desorbed and analyzed separately to determine if any breakthrough occurred. Breakthrough is said to have occurred if the organic catch weight on the last fraction (generally the backhalf of the last adsorbent tube) is more than 10% of the total train organic catch.

5.4 Data Validation and Presentation

The field test engineer is responsible for reviewing and validating data as it is obtained. Additionally the onsite project manager reviews data for consistency, completeness, and accuracy prior to leaving the site. This validation procedure is based upon their knowledge of the process being tested and/or similar sources as well as checks built into the software being utilized. This allows for error correction or for the testing to be repeated immediately rather than at a later undetermined date. The data undergoes another review by a Project Director upon return to headquarters. Analytical data is reviewed by the QA Director upon submittal by the analytical laboratory to resolve any conflicts or concerns as soon as possible rather than after the results have been calculated.

Data is collected using computerized spreadsheets in the field and the results are calculated using validated computer programs to prevent erroneous calculations.

5.5 QA/QC Results

This section presents QA/QC results from measures taken during the testing program. The results are summarized in the following tables for easy reference.

Table 5-1
Summary of QA/QC Procedures

Test Method	QA/QC Procedure	QA/QC Objective	QA/QC Results	Status of QA/QC
EPA M8	Reagent Blank	NA	< 0.029 mg	Acceptable
	H2SO4 Matrix Spike	90 – 110 %	103.9 %	Acceptable
EPA M13B	NaOH Blank – HF	ND	< 0.1 ug	Acceptable
	DI Blank – HF	ND	< 0.1 ug	Acceptable
	Filter in DI Blank – HF	ND	< 0.1 ug	Acceptable
	Spike Recovery	90 – 110 %	98 %	Acceptable
CARB M425	NaOH Blank – Cr+6	ND	0.117 ug	Acceptable
	DI Blank – Cr+6	ND	< 0.05ug	Acceptable
	Spike Recovery	75 – 125 %	106 %	Acceptable
EPA M23	Internal Standard Recoveries (4-6)	40 – 130 %	46.2 – 96.5 %	Acceptable
	Internal Standard Recoveries (7-8)	25 – 130 %	34.6 – 102 %	Acceptable
	Surrogate Standard Recoveries	70 – 130 %	86.7 – 110 %	Acceptable
EPA MM26	HCl Reagent Blank	ND	< 0.086 mg	Acceptable
	HCl Matrix Spike	90 – 110 %	99.8 %	Acceptable
EPA M29	Acetone Blank	< 1.0E-05 mg/mg	0.00E-06 mg/mg	Acceptable
EPA M29	Duplicate RPD	≤ 20 %	0 – 3.4 %	Acceptable
Arsenic	Reagent Blank	NA	< 0.2 ug	Acceptable
Beryllium	Reagent Blank	NA	< 0.05 ug	Acceptable
Cadmium	Reagent Blank	NA	< 0.2 ug	Acceptable
Chromium	Reagent Blank	NA	2.23 ug	Acceptable, blank correction
Lead	Reagent Blank	NA	1.13 ug	Acceptable, blank correction
Metals	Spike Recoveries	75 – 125 %	84 – 109 %	Acceptable
Mercury	Reagent Blank	NA	< 0.5 ug	Acceptable
Mercury	Duplicate RPD	≤ 20 %	0 – 7.7 %	Acceptable
Mercury	Spike Recoveries	75 – 125 %	78 – 110 %	Acceptable

Table 5-2
Performance Audit Results

Test Method	Audit ID	QA/QC Objective	QA/QC Results	Status of QA/QC
EPA M8 – Sulfate	Audit 061614AA, Cat No. 1444, Solution	± 15 %	118 mg/dscm 109 mg/DSCM	Unacceptable Acceptable ¹
EPA M13B - Fluoride	Audit 061614BB, Cat No. 1441, Solution	± 15 %	4.60 mg/dscm	Acceptable
EPA M26 – Hydrogen Chloride	Audit 061614AA, Cat No. 1440, Solution	± 10 %	31.1 mg/L	Acceptable
EPA M29 - Arsenic	Audit 061614BB, Cat No. 1425, Filter	± 25 %	35.7 ug/filter	Acceptable
EPA M29 - Beryllium	Audit 061614BB, Cat No. 1425, Filter	± 25 %	29.7 ug/filter	Acceptable
EPA M29 - Cadmium	Audit 061614BB, Cat No. 1425, Filter	± 20 %	39.5 ug/filter	Acceptable
EPA M29 - Chromium	Audit 061614BB, Cat No. 1425, Filter	± 20 %	40.6 ug/filter	Acceptable
EPA M29 - Lead	Audit 061614BB, Cat No. 1425, Filter	± 20 %	87.9 ug/filter	Acceptable
EPA M29 - Arsenic	Audit 061614BB, Cat No. 1426, Solution	± 25 %	1.60 ug/mL	Acceptable
EPA M29 - Beryllium	Audit 061614BB, Cat No. 1426, Solution	± 30 %	0.078 ug/mL	Acceptable
EPA M29 - Cadmium	Audit 061614BB, Cat No. 1426, Solution	± 20 %	0.245 ug/mL	Acceptable
EPA M29 - Chromium	Audit 061614BB, Cat No. 1426, Solution	± 20 %	0.285 ug/mL	Acceptable
EPA M29 - Lead	Audit 061614BB, Cat No. 1426, Solution	± 25 %	0.256 ug/mL	Acceptable
EPA M29 - Mercury	Audit 061614BB, Cat No. 1428, Solution	± 25 %	1.99 ng/mL	Acceptable

¹ The sulfate audit was unacceptable originally (1.7% above the acceptable range) and was reanalyzed with an acceptable result.. Both results are presented above.

APPENDIX A
Test Results

**APPENDIX A.1
Test Results**

**Unit 1 SDA Inlet
Hydrogen Chloride**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

M26

Client Name	Covanta Energy Group, Inc.	Operator	WES
Plant Name	Kent County Waste-to-Energy Facility	Project #	14016
Sampling Location	Unit 1 SDA Inlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	1-I-MM26-1	1-I-MM26-2	1-I-MM26-3	
Run Date	06/24/14	06/24/14	06/25/14	
Run Start Time	hh:mm 0816	0936	0908	
Run Stop Time	hh:mm 0916	1036	1008	

Sampling Parameters

Meter Calibration Factor	Y	0.9903	0.9903	0.9903	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0222	0.9968	0.9974	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-1.40	-1.40	-1.40	-1.40
Barometric Pressure	in Hg	29.3	29.3	29.3	29.3
Carbon Dioxide Percentage	% CO ₂	10.0	10.0	10.0	10.0
Oxygen Percentage	% O ₂	9.7	9.7	9.7	9.7
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	145.4	146.1	184.8	158.8
Sample Volume	ft ³	38.210	39.236	39.117	38.854
Average Meter Temperature	°F	75	76	74	75
Average Delta H	in H ₂ O	1.20	1.20	1.20	1.20
Total Sampling Time	min	60.0	60.0	60.0	60.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	6.844	6.877	8.699	7.473
Volume Metered @ STP	DSCF	36.674	37.560	37.627	37.287
Absolute Stack/Duct Pressure	in Hg	29.2	29.2	29.2	29.2
Absolute Meter Pressure	in Hg	29.4	29.4	29.4	29.4
Calculated Stack Moisture	% H ₂ O	15.7	15.5	18.8	16.7

Concentration and Emission Rate Data Summary

Hydrogen Chloride	mg	942	1280	1004	
Molecular Weight	MW	36.46	36.46	36.46	36.46
Concentration, ppm	ppm	598	794	622	671
Concentration, ppm @ 12% CO ₂	ppm@12%	718	953	746	806
Concentration, ppm @ 7% O ₂	ppm@7%	743	985	772	833

**APPENDIX A.2
Test Results**

**Unit 1 SDA Inlet
Mercury**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

29

Client Name	Covanta Energy Group, Inc.	Operator	WES
Plant Name	Kent County Waste-to-Energy Facility	Project #	14016
Sampling Location	Unit 1 SDA Inlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	1-I-M29-1	1-I-M29-2	1-I-M29-3	
Run Date	06/24/14	06/25/14	06/25/14	
Run Start Time	hh:mm 0815	0907	1405	
Run Stop Time	hh:mm 1022	1114	1610	

Sampling Parameters

Meter Calibration Factor	Y	1.0188	1.0188	1.0188	
Y _{QA} Calculated by Test Run	Y _{QA}	0.9906	1.0154	0.9974	
Y _{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-1.40	-1.30	-1.50	-1.40
Stack Cross-Sectional Area	ft ²	23.044	23.044	23.044	23.044
Barometric Pressure	in Hg	29.3	29.3	29.3	29.3
Actual Nozzle Diameter	in	0.258	0.263	0.258	
Carbon Dioxide Percentage	% CO ₂	10.0	10.0	10.5	10.2
Oxygen Percentage	% O ₂	9.7	9.7	9.2	9.5
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	272.5	300.5	374.7	315.9
Sample Volume	ft ³	63.287	68.153	64.680	65.373
Average Meter Temperature	°F	80	80	81	81
Average Stack Temperature	°F	431	421	424	425
Average Delta H	in H ₂ O	0.82	1.01	0.87	0.90
Total Sampling Time	min	120.0	120.0	120.0	120.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	12.827	14.145	17.637	14.869
Volume Metered @ STP	DSCF	61.809	66.646	63.039	63.831
Absolute Stack/Duct Pressure	in Hg	29.2	29.2	29.2	29.2
Absolute Meter Pressure	in Hg	29.4	29.4	29.4	29.4
Calculated Stack Moisture	% H ₂ O	17.2	17.5	21.9	18.9
Dry Mole Fraction	decimal	0.828	0.825	0.781	0.811
Avg Square of Differential Pressure	in H ₂ O	0.670	0.675	0.655	0.667
Avg Square of Diff. Pres., Squared	in H ₂ O	0.448	0.455	0.429	0.444
Dry Gas Molecular Weight	lb/lb-mole	29.99	29.99	30.05	30.01
Wet Stack Gas Molecular Weight	lb/lb-mole	27.93	27.89	27.41	27.74
Average Stack Gas Velocity	ft/sec	50.26	50.40	49.45	50.03
Percent of Isokinetic Rate	% ISO	98.2	100.9	107.1	102.1

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	69,486	69,681	68,373	69,180
Dry Standard Stack Flow/Minute	DSCFM	33,294	33,622	31,137	32,684
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	26,826	27,092	26,209	26,709

Concentration and Emission Rate Data Summary

Mercury (Hg)	ug	130.200	102.450	67.357	100.002
Concentration, ug/DSCM	ug/DSCM	74.4	54.3	37.7	55.5
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	89.3	65.1	43.1	65.8
Concentration, ug/DSCM @ 7% O ₂	ug@7%	92.3	67.4	44.8	68.2
Emission Rate, lb/hr	lb/hr	9.28E-03	6.84E-03	4.40E-03	6.84E-03

**APPENDIX A.3
Test Results**

**Unit 1 Stack
Hydrogen Chloride**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

M26

Client Name	Covanta Energy Group, Inc.	Operator	CAN
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 1 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	1-S-MM26-1	1-S-MM26-2	1-S-MM26-3	
Run Date	06/24/14	06/24/14	06/25/14	
Run Start Time	hh:mm 0816	0936	0908	
Run Stop Time	hh:mm 0916	1036	1008	

Sampling Parameters

Meter Calibration Factor	Y	1.0186	1.0186	0.9969	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0181	1.0209	0.9869	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.90	-1.00	-0.93
Barometric Pressure	in Hg	29.2	29.2	29.2	29.2
Carbon Dioxide Percentage	% CO ₂	8.0	8.0	8.2	8.1
Oxygen Percentage	% O ₂	11.6	11.6	11.5	11.6
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.4	80.4	80.3	80.4
Total Water Volume Collected	mL	155.5	156.1	174.2	161.9
Sample Volume	ft ³	41.912	41.892	41.773	41.859
Average Meter Temperature	°F	90	93	89	91
Average Delta H	in H ₂ O	1.40	1.40	1.40	1.40
Total Sampling Time	min	60.0	60.0	60.0	60.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	7.319	7.348	8.200	7.622
Volume Metered @ STP	DSCF	40.098	39.895	39.242	39.745
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1	29.1
Absolute Meter Pressure	in Hg	29.3	29.3	29.3	29.3
Calculated Stack Moisture	% H ₂ O	15.4	15.6	17.3	16.1

Air Flow Rate Results

Dry Standard Stack Flow/Minute	DSCFM	44,834	44,834	44,657	44,775
Air Flow Taken From Test Run ID	NA	1-S-M29-1	1-S-M29-1	1-S-M29-2	NA

Concentration and Emission Rate Data Summary

Hydrogen Chloride	mg	18.3	19.2	25.5	
Molecular Weight	MW	36.46	36.46	36.46	36.46
Concentration, ppm	ppm	10.6	11.2	15.1	12.3
Concentration, ppm @ 12% CO ₂	ppm@12%	15.9	16.8	22.2	18.3
Concentration, ppm @ 7% O ₂	ppm@7%	15.9	16.8	22.4	18.3
Emission Rate, lb/hr	lb/hr	2.71	2.85	3.84	3.13

Removal Efficiency Summary For: HCl

Unit #	Repetition Number	ppm @ 7% O2		Removal Efficiency, %
		Inlet Result	Stack Result	
1	1	743	15.9	97.9%
	2	985	16.8	98.3%
	3	772	22.4	97.1%
			AVERAGE =>	97.8%

**APPENDIX A.4
Test Results**

**Unit 1 Stack
Particulate and Metals**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

29

Client Name	Covanta Energy Group, Inc.	Operator	JMA	
Plant Name	Kent County Waste to Energy Facility	Project #	14016	
Sampling Location	Unit 1 Stack	Standard Temperature, °F	68	
USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	1-S-M29-1	1-S-M29-2	1-S-M29-3	
Run Date	06/24/14	06/25/14	06/25/14	
Run Start Time	hh:mm 0815	0907	1405	
Run Stop Time	hh:mm 1022	1114	1610	
Sampling Parameters				
Meter Calibration Factor	Y	0.9825	0.9825	0.9825
Y _{QA} Calculated by Test Run	Y _{QA}	0.9976	0.9899	0.9955
Y _{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84
Stack/Duct Static Pressure	in H ₂ O	-0.90	-1.00	-1.00
Stack Cross-Sectional Area	ft ²	16.499	16.499	16.499
Barometric Pressure	in Hg	29.2	29.2	29.2
Actual Nozzle Diameter	in	0.216	0.212	0.216
Carbon Dioxide Percentage	% CO ₂	8.0	8.2	7.5
Oxygen Percentage	% O ₂	11.6	11.5	12.2
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.4	80.3	80.3
Total Water Volume Collected	mL	327.9	333.6	300.1
Sample Volume	ft ³	90.906	88.657	91.161
Average Meter Temperature	°F	84	87	90
Average Stack Temperature	°F	311	311	313
Average Delta H	in H ₂ O	1.70	1.59	1.68
Total Sampling Time	min	120.0	120.0	120.0
Air Flow Parameters				
Volume of Water vapor @ STP	SCF	15.434	15.703	14.126
Volume Metered @ STP	DSCF	84.918	82.371	84.280
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1
Absolute Meter Pressure	in Hg	29.3	29.3	29.3
Calculated Stack Moisture	% H ₂ O	15.4	16.0	14.4
Dry Mole Fraction	decimal	0.846	0.840	0.856
Avg Square of Differential Pressure	in H ₂ O	1.148	1.152	1.142
Avg Square of Diff. Pres., Squared	in H ₂ O	1.318	1.326	1.304
Dry Gas Molecular Weight	lb/lb-mole	29.74	29.77	29.69
Wet Stack Gas Molecular Weight	lb/lb-mole	27.94	27.89	28.01
Average Stack Gas Velocity	ft/sec	80.23	80.57	79.80
Percent of Isokinetic Rate	% ISO	102.4	103.5	101.2
Air Flow Rate Results				
Actual Stack Flow/Minute	ACFM	79,421	79,755	79,001
Dry Standard Stack Flow/Minute	DSCFM	44,834	44,657	44,995
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	29,997	30,200	28,162

Concentration and Emission Rate Data Summary					
Filterable Particulate	mg	14.0	7.1	4.8	8.6
Concentration, Gr/DSCF	gr/DSCF	2.54E-03	1.33E-03	8.79E-04	1.58E-03
Concentration, Gr/DSCF @ 12% CO ₂	Gr@12%	3.82E-03	1.95E-03	1.41E-03	2.39E-03
Concentration, Gr/DSCF @ 7% O ₂	Gr@7%	3.80E-03	1.97E-03	1.40E-03	2.39E-03
Concentration, mg/DSCM	mg/DSCM	5.82	3.04	2.01	3.63
Concentration, mg/DSCM @ 7% O ₂	mg@7%	8.70	4.50	3.21	5.47
Emission Rate, lb/hr	lb/hr	0.978	0.509	0.339	0.609
Cadmium (Cd)	ug	1.770	1.875	1.650	1.765
Concentration, ug/DSCM	ug/DSCM	0.736	0.804	0.691	0.744
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	1.10	1.18	1.11	1.13
Concentration, ug/DSCM @ 7% O ₂	ug@7%	1.10	1.19	1.10	1.13
Emission Rate, lb/hr	lb/hr	1.24E-04	1.34E-04	1.17E-04	1.25E-04
Lead (Pb)	ug	23.870	20.670	29.870	24.803
Concentration, ug/DSCM	ug/DSCM	9.93	8.86	12.5	10.4
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	14.9	13.0	20.0	16.0
Concentration, ug/DSCM @ 7% O ₂	ug@7%	14.8	13.1	20.0	16.0
Emission Rate, lb/hr	lb/hr	1.67E-03	1.48E-03	2.11E-03	1.75E-03
Mercury (Hg)	ug	1.565	1.240	1.232	1.346
Concentration, ug/DSCM	ug/DSCM	0.651	0.532	0.516	0.566
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	0.976	0.778	0.826	0.860
Concentration, ug/DSCM @ 7% O ₂	ug@7%	0.973	0.786	0.825	0.861
Emission Rate, lb/hr	lb/hr	1.09E-04	8.89E-05	8.70E-05	9.51E-05

Removal Efficiency Summary For: Hg

Unit #	Repetition Number	ug/DSCM@7%		Removal Efficiency, %
		Inlet Result	Stack Result	
1	1	92.3	0.973	98.9%
	2	67.4	0.786	98.8%
	3	44.8	0.825	98.2%
		AVERAGE =>		98.6%

**APPENDIX A.5
Test Results**

**Unit 2 SDA Inlet
Hydrogen Chloride**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

M26

Client Name	Covanta Energy Group, Inc.	Operator	WES
Plant Name	Kent County Waste-to-Energy Facility	Project #	14016
Sampling Location	Unit 2 SDA Inlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-I-MM26-1	2-I-MM26-2	2-I-MM26-3	
Run Date	06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm 0907	1036	1225	
Run Stop Time	hh:mm 1016	1136	1325	

Sampling Parameters

Meter Calibration Factor	Y	0.9903	0.9903	0.9903	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0025	1.0035	1.0150	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-1.50	-1.40	-1.55	-1.48
Barometric Pressure	in Hg	29.2	29.2	29.2	29.2
Carbon Dioxide Percentage	% CO ₂	11.5	11.5	11.8	11.6
Oxygen Percentage	% O ₂	8.2	8.2	7.9	8.1
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	151.5	176.1	216.5	181.4
Sample Volume	ft ³	38.645	38.717	38.229	38.530
Average Meter Temperature	°F	68	71	70	69
Average Delta H	in H ₂ O	1.20	1.20	1.20	1.20
Total Sampling Time	min	60.0	60.0	60.0	60.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	7.131	8.289	10.191	8.537
Volume Metered @ STP	DSCF	37.474	37.331	36.910	37.238
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1	29.1
Absolute Meter Pressure	in Hg	29.3	29.3	29.3	29.3
Calculated Stack Moisture	% H ₂ O	16.0	18.2	21.6	18.6

Concentration and Emission Rate Data Summary

Hydrogen Chloride	mg	848	862	1114	
Molecular Weight	MW	36.46	36.46	36.46	36.46
Concentration, ppm	ppm	527	538	703	589
Concentration, ppm @ 12% CO ₂	ppm@12%	550	561	715	609
Concentration, ppm @ 7% O ₂	ppm@7%	577	589	752	639

**APPENDIX A.6
Test Results**

**Unit 2 SDA Inlet
Mercury**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

29

Client Name	Covanta Energy Group, Inc.	Operator	WES
Plant Name	Kent County Waste-to-Energy Facility	Project #	14016
Sampling Location	Unit 2 SDA Inlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-I-M29-1	2-I-M29-2	2-I-M29-3	
Run Date	06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm 0906	1224	1511	
Run Stop Time	hh:mm 1132	1432	1728	

Sampling Parameters

Meter Calibration Factor	Y	1.0188	1.0188	1.0188	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0015	1.0111	1.0041	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-1.50	-1.55	-1.50	-1.52
Stack Cross-Sectional Area	ft ²	23.044	23.044	23.044	23.044
Barometric Pressure	in Hg	29.2	29.2	29.2	29.2
Actual Nozzle Diameter	in	0.263	0.261	0.263	
Carbon Dioxide Percentage	% CO ₂	11.5	11.8	11.5	11.6
Oxygen Percentage	% O ₂	8.2	7.9	8.2	8.1
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	292.3	335.5	277.3	301.7
Sample Volume	ft ³	67.525	62.672	64.213	64.803
Average Meter Temperature	°F	78	80	83	80
Average Stack Temperature	°F	423	428	429	427
Average Delta H	in H ₂ O	0.96	0.85	0.87	0.89
Total Sampling Time	min	120.0	120.0	120.0	120.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	13.759	15.792	13.053	14.201
Volume Metered @ STP	DSCF	65.996	61.077	62.179	63.084
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1	29.1
Absolute Meter Pressure	in Hg	29.3	29.3	29.3	29.3
Calculated Stack Moisture	% H ₂ O	17.3	20.5	17.3	18.4
Dry Mole Fraction	decimal	0.827	0.795	0.827	0.816
Avg Square of Differential Pressure	in H ₂ O	0.663	0.631	0.628	0.641
Avg Square of Diff. Pres., Squared	in H ₂ O	0.439	0.398	0.395	0.411
Dry Gas Molecular Weight	lb/lb-mole	30.17	30.20	30.17	30.18
Wet Stack Gas Molecular Weight	lb/lb-mole	28.07	27.70	28.06	27.94
Average Stack Gas Velocity	ft/sec	49.49	47.59	47.08	48.05
Percent of Isokinetic Rate	% ISO	102.1	104.6	101.9	102.9

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	68,421	65,796	65,094	66,437
Dry Standard Stack Flow/Minute	DSCFM	32,909	30,204	31,061	31,391
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	30,068	28,249	28,379	28,899

Concentration and Emission Rate Data Summary

Mercury (Hg)	ug	182.505	123.920	152.385	152.937
Concentration, ug/DSCM	ug/DSCM	97.6	71.6	86.5	85.3
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	102	72.9	90.3	88.4
Concentration, ug/DSCM @ 7% O ₂	ug@7%	107	76.6	94.7	92.7
Emission Rate, lb/hr	lb/hr	1.20E-02	8.11E-03	1.01E-02	1.01E-02

**APPENDIX A.7
Test Results**

**Unit 2 Stack
Dioxins/Furans**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

23

Client Name	Covanta Energy Group, Inc.	Operator	JMA
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-S-M23-1	2-S-M23-2	2-S-M23-3	
Run Date	06/26/14	06/27/14	06/27/14	
Run Start Time	hh:mm 1055	0730	1150	
Run Stop Time	hh:mm 1500	1135	1555	

Sampling Parameters

Meter Calibration Factor	Y	1.0186	1.0186	0.9825	
Y _{OA} Calculated by Test Run	Y _{OA}	0.9991	0.9943	0.9762	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.95	-0.95	-0.93
Stack Cross-Sectional Area	ft ²	16.499	16.499	16.499	16.499
Barometric Pressure	in Hg	29.9	29.9	29.9	29.9
Actual Nozzle Diameter	in	0.196	0.196	0.196	
Carbon Dioxide Percentage	% CO ₂	8.2	9.2	9.0	8.8
Oxygen Percentage	% O ₂	11.4	10.5	10.7	10.9
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.4	80.3	80.3	80.3
Total Water Volume Collected	mL	549.7	554.7	527.3	543.9
Sample Volume	ft ³	138.014	134.040	141.284	137.779
Average Meter Temperature	°F	91	91	92	91
Average Stack Temperature	°F	309	308	310	309
Average Delta H	in H ₂ O	0.94	0.88	1.00	0.94
Total Sampling Time	min	240.0	240.0	240.0	240.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	25.874	26.110	24.820	25.601
Volume Metered @ STP	DSCF	134.950	131.071	132.934	132.985
Absolute Stack/Duct Pressure	in Hg	29.8	29.8	29.8	29.8
Absolute Meter Pressure	in Hg	30.0	30.0	30.0	30.0
Calculated Stack Moisture	% H ₂ O	16.1	16.6	15.7	16.1
Saturated Stack Moisture	% H ₂ O	100.0	100.0	100.0	100.0
Reported Stack Moisture Content	% H ₂ O	16.1	16.6	15.7	16.1
Dry Mole Fraction	decimal	0.839	0.834	0.843	0.839
Avg Square of Differential Pressure	in H ₂ O	1.107	1.100	1.109	1.105
Avg Square of Diff. Pres., Squared	in H ₂ O	1.225	1.210	1.229	1.221
Dry Gas Molecular Weight	lb/lb-mole	29.77	29.89	29.87	29.84
Wet Stack Gas Molecular Weight	lb/lb-mole	27.87	27.92	28.00	27.93
Average Stack Gas Velocity	ft/sec	76.41	75.88	76.45	76.25
Percent of Isokinetic Rate	% ISO	101.9	100.3	100.1	100.7

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	75,640	75,117	75,680	75,479
Dry Standard Stack Flow/Minute	DSCFM	43,470	42,910	43,601	43,327
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	29,710	32,105	31,995	31,270

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls Page 1 of 10

07/10/14

Concentration and Emission Rate Data Summary					
2,3,7,8-TCDD	pg	0.00	7.48	2.20	3.23
Concentration, ng/DSCM	ng/DSCM	0.00E+00	2.02E-03	5.84E-04	8.66E-04
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	2.63E-03	7.79E-04	1.14E-03
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	2.69E-03	7.96E-04	1.16E-03
Emission Rate, lb/hr	lb/hr	0.00E+00	3.24E-10	9.54E-11	1.40E-10
Emission Rate, grams/second	g/s	0.00E+00	4.08E-11	1.20E-11	1.76E-11

Other TCDD	pg	516.00	592.52	634.80	581.11
Concentration, ng/DSCM	ng/DSCM	1.35E-01	1.60E-01	1.69E-01	1.54E-01
Concen., ng/DSCM @ 12% CO2	ng@12%	1.98E-01	2.08E-01	2.25E-01	2.10E-01
Concen., ng/DSCM @ 7% O2	ng@7%	1.98E-01	2.13E-01	2.30E-01	2.14E-01
Emission Rate, lb/hr	lb/hr	2.20E-08	2.57E-08	2.75E-08	2.51E-08
Emission Rate, grams/second	g/s	2.77E-09	3.23E-09	3.47E-09	3.16E-09

1,2,3,7,8-PeCDD	pg	7.75	14.60	10.90	11.08
Concentration, ng/DSCM	ng/DSCM	2.03E-03	3.93E-03	2.90E-03	2.95E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	2.97E-03	5.13E-03	3.86E-03	3.99E-03
Concen., ng/DSCM @ 7% O2	ng@7%	2.97E-03	5.26E-03	3.95E-03	4.06E-03
Emission Rate, lb/hr	lb/hr	3.30E-10	6.32E-10	4.73E-10	4.78E-10
Emission Rate, grams/second	g/s	4.16E-11	7.97E-11	5.96E-11	6.03E-11

Other PeCDD	pg	627.25	625.40	691.10	647.92
Concentration, ng/DSCM	ng/DSCM	1.64E-01	1.68E-01	1.84E-01	1.72E-01
Concen., ng/DSCM @ 12% CO2	ng@12%	2.40E-01	2.20E-01	2.45E-01	2.35E-01
Concen., ng/DSCM @ 7% O2	ng@7%	2.40E-01	2.25E-01	2.50E-01	2.38E-01
Emission Rate, lb/hr	lb/hr	2.67E-08	2.71E-08	3.00E-08	2.79E-08
Emission Rate, grams/second	g/s	3.37E-09	3.41E-09	3.78E-09	3.52E-09

1,2,3,4,7,8-HxCDD	pg	12.30	15.10	9.90	12.43
Concentration, ng/DSCM	ng/DSCM	3.22E-03	4.07E-03	2.63E-03	3.31E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	4.71E-03	5.31E-03	3.51E-03	4.51E-03
Concen., ng/DSCM @ 7% O2	ng@7%	4.71E-03	5.44E-03	3.58E-03	4.58E-03
Emission Rate, lb/hr	lb/hr	5.24E-10	6.54E-10	4.30E-10	5.36E-10
Emission Rate, grams/second	g/s	6.60E-11	8.24E-11	5.41E-11	6.75E-11

1,2,3,6,7,8-HxCDD	pg	36.90	44.10	41.00	40.67
Concentration, ng/DSCM	ng/DSCM	9.65E-03	1.19E-02	1.09E-02	1.08E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.41E-02	1.55E-02	1.45E-02	1.47E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.41E-02	1.59E-02	1.48E-02	1.49E-02
Emission Rate, lb/hr	lb/hr	1.57E-09	1.91E-09	1.78E-09	1.75E-09
Emission Rate, grams/second	g/s	1.98E-10	2.41E-10	2.24E-10	2.21E-10

1,2,3,7,8,9-HxCDD	pg	20.50	27.30	19.90	22.57
Concentration, ng/DSCM	ng/DSCM	5.36E-03	7.35E-03	5.29E-03	6.00E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	7.85E-03	9.59E-03	7.05E-03	8.16E-03
Concen., ng/DSCM @ 7% O2	ng@7%	7.85E-03	9.83E-03	7.20E-03	8.29E-03
Emission Rate, lb/hr	lb/hr	8.73E-10	1.18E-09	8.63E-10	9.73E-10
Emission Rate, grams/second	g/s	1.10E-10	1.49E-10	1.09E-10	1.23E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls Page 2 of 10

07/10/14

Other HxCDD	pg	895.30	923.50	979.20	932.67
Concentration, ng/DSCM	ng/DSCM	2.34E-01	2.49E-01	2.60E-01	2.48E-01
Concen., ng/DSCM @ 12% CO2	ng@12%	3.43E-01	3.25E-01	3.47E-01	3.38E-01
Concen., ng/DSCM @ 7% O2	ng@7%	3.43E-01	3.33E-01	3.54E-01	3.43E-01
Emission Rate, lb/hr	lb/hr	3.81E-08	4.00E-08	4.25E-08	4.02E-08
Emission Rate, grams/second	g/s	4.81E-09	5.04E-09	5.35E-09	5.07E-09

1,2,3,4,6,7,8-HpCDD	pg	295.00	332.00	309.00	312.00
Concentration, ng/DSCM	ng/DSCM	7.72E-02	8.94E-02	8.21E-02	8.29E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.13E-01	1.17E-01	1.09E-01	1.13E-01
Concen., ng/DSCM @ 7% O2	ng@7%	1.13E-01	1.20E-01	1.12E-01	1.15E-01
Emission Rate, lb/hr	lb/hr	1.26E-08	1.44E-08	1.34E-08	1.35E-08
Emission Rate, grams/second	g/s	1.58E-09	1.81E-09	1.69E-09	1.69E-09

Other HpCDD	pg	290.00	314.00	295.00	299.67
Concentration, ng/DSCM	ng/DSCM	7.59E-02	8.46E-02	7.84E-02	7.96E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.11E-01	1.10E-01	1.04E-01	1.09E-01
Concen., ng/DSCM @ 7% O2	ng@7%	1.11E-01	1.13E-01	1.07E-01	1.10E-01
Emission Rate, lb/hr	lb/hr	1.24E-08	1.36E-08	1.28E-08	1.29E-08
Emission Rate, grams/second	g/s	1.56E-09	1.71E-09	1.61E-09	1.63E-09

OCDD	pg	530.00	569.00	526.00	541.67
Concentration, ng/DSCM	ng/DSCM	1.39E-01	1.53E-01	1.40E-01	1.44E-01
Concen., ng/DSCM @ 12% CO2	ng@12%	2.03E-01	2.00E-01	1.86E-01	1.96E-01
Concen., ng/DSCM @ 7% O2	ng@7%	2.03E-01	2.05E-01	1.90E-01	1.99E-01
Emission Rate, lb/hr	lb/hr	2.26E-08	2.46E-08	2.28E-08	2.33E-08
Emission Rate, grams/second	g/s	2.85E-09	3.10E-09	2.88E-09	2.94E-09

2,3,7,8-TCDF	pg	12.30	36.90	15.90	21.70
Concentration, ng/DSCM	ng/DSCM	3.22E-03	9.94E-03	4.22E-03	5.79E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	4.71E-03	1.30E-02	5.63E-03	7.77E-03
Concen., ng/DSCM @ 7% O2	ng@7%	4.71E-03	1.33E-02	5.76E-03	7.92E-03
Emission Rate, lb/hr	lb/hr	5.24E-10	1.60E-09	6.90E-10	9.37E-10
Emission Rate, grams/second	g/s	6.60E-11	2.01E-10	8.69E-11	1.18E-10

Other TCDF	pg	472.70	870.10	528.10	623.63
Concentration, ng/DSCM	ng/DSCM	1.24E-01	2.34E-01	1.40E-01	1.66E-01
Concen., ng/DSCM @ 12% CO2	ng@12%	1.81E-01	3.06E-01	1.87E-01	2.25E-01
Concen., ng/DSCM @ 7% O2	ng@7%	1.81E-01	3.13E-01	1.91E-01	2.28E-01
Emission Rate, lb/hr	lb/hr	2.01E-08	3.77E-08	2.29E-08	2.69E-08
Emission Rate, grams/second	g/s	2.54E-09	4.75E-09	2.89E-09	3.39E-09

1,2,3,7,8-PeCDF	pg	16.10	49.90	18.80	28.27
Concentration, ng/DSCM	ng/DSCM	4.21E-03	1.34E-02	4.99E-03	7.55E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	6.16E-03	1.75E-02	6.66E-03	1.01E-02
Concen., ng/DSCM @ 7% O2	ng@7%	6.16E-03	1.80E-02	6.81E-03	1.03E-02
Emission Rate, lb/hr	lb/hr	6.86E-10	2.16E-09	8.16E-10	1.22E-09
Emission Rate, grams/second	g/s	8.64E-11	2.72E-10	1.03E-10	1.54E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

2,3,4,7,8-PeCDF	pg	25.50	53.00	28.90	35.80
Concentration, ng/DSCM	ng/DSCM	6.67E-03	1.43E-02	7.68E-03	9.54E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	9.76E-03	1.86E-02	1.02E-02	1.29E-02
Concen., ng/DSCM @ 7% O2	ng@7%	9.76E-03	1.91E-02	1.05E-02	1.31E-02
Emission Rate, lb/hr	lb/hr	1.09E-09	2.30E-09	1.25E-09	1.55E-09
Emission Rate, grams/second	g/s	1.37E-10	2.89E-10	1.58E-10	1.95E-10

Other PeCDF	pg	263.40	558.10	282.30	367.93
Concentration, ng/DSCM	ng/DSCM	6.89E-02	1.50E-01	7.50E-02	9.81E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.01E-01	1.96E-01	1.00E-01	1.32E-01
Concen., ng/DSCM @ 7% O2	ng@7%	1.01E-01	2.01E-01	1.02E-01	1.35E-01
Emission Rate, lb/hr	lb/hr	1.12E-08	2.42E-08	1.22E-08	1.59E-08
Emission Rate, grams/second	g/s	1.41E-09	3.05E-09	1.54E-09	2.00E-09

1,2,3,4,7,8-HxCDF	pg	22.00	51.50	23.20	32.23
Concentration, ng/DSCM	ng/DSCM	5.76E-03	1.39E-02	6.16E-03	8.60E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	8.42E-03	1.81E-02	8.22E-03	1.16E-02
Concen., ng/DSCM @ 7% O2	ng@7%	8.42E-03	1.85E-02	8.40E-03	1.18E-02
Emission Rate, lb/hr	lb/hr	9.37E-10	2.23E-09	1.01E-09	1.39E-09
Emission Rate, grams/second	g/s	1.18E-10	2.81E-10	1.27E-10	1.75E-10

1,2,3,6,7,8-HxCDF	pg	22.90	55.00	24.00	33.97
Concentration, ng/DSCM	ng/DSCM	5.99E-03	1.48E-02	6.37E-03	9.06E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	8.77E-03	1.93E-02	8.50E-03	1.22E-02
Concen., ng/DSCM @ 7% O2	ng@7%	8.77E-03	1.98E-02	8.69E-03	1.24E-02
Emission Rate, lb/hr	lb/hr	9.76E-10	2.38E-09	1.04E-09	1.47E-09
Emission Rate, grams/second	g/s	1.23E-10	3.00E-10	1.31E-10	1.85E-10

2,3,4,6,7,8-HxCDF	pg	29.00	48.50	31.10	36.20
Concentration, ng/DSCM	ng/DSCM	7.59E-03	1.31E-02	8.26E-03	9.64E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	1.11E-02	1.70E-02	1.10E-02	1.31E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.11E-02	1.75E-02	1.13E-02	1.33E-02
Emission Rate, lb/hr	lb/hr	1.24E-09	2.10E-09	1.35E-09	1.56E-09
Emission Rate, grams/second	g/s	1.56E-10	2.65E-10	1.70E-10	1.97E-10

1,2,3,7,8,9-HxCDF	pg	0.00	0.00	0.00	0.00
Concentration, ng/DSCM	ng/DSCM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Emission Rate, lb/hr	lb/hr	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Emission Rate, grams/second	g/s	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Other HxCDF	pg	161.10	282.00	180.70	207.93
Concentration, ng/DSCM	ng/DSCM	4.22E-02	7.60E-02	4.80E-02	5.54E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	6.17E-02	9.91E-02	6.40E-02	7.49E-02
Concen., ng/DSCM @ 7% O2	ng@7%	6.17E-02	1.02E-01	6.54E-02	7.62E-02
Emission Rate, lb/hr	lb/hr	6.86E-09	1.22E-08	7.84E-09	8.97E-09
Emission Rate, grams/second	g/s	8.65E-10	1.54E-09	9.88E-10	1.13E-09

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls Page 4 of 10 07/10/14

1,2,3,4,6,7,8-HpCDF	pg	71.60	115.00	64.10	83.57
Concentration, ng/DSCM	ng/DSCM	1.87E-02	3.10E-02	1.70E-02	2.22E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	2.74E-02	4.04E-02	2.27E-02	3.02E-02
Concen., ng/DSCM @ 7% O2	ng@7%	2.74E-02	4.14E-02	2.32E-02	3.07E-02
Emission Rate, lb/hr	lb/hr	3.05E-09	4.98E-09	2.78E-09	3.60E-09
Emission Rate, grams/second	g/s	3.84E-10	6.27E-10	3.50E-10	4.54E-10

1,2,3,4,7,8,9-HpCDF	pg	9.00	22.90	11.10	14.33
Concentration, ng/DSCM	ng/DSCM	2.35E-03	6.17E-03	2.95E-03	3.82E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	3.45E-03	8.05E-03	3.93E-03	5.14E-03
Concen., ng/DSCM @ 7% O2	ng@7%	3.45E-03	8.25E-03	4.02E-03	5.24E-03
Emission Rate, lb/hr	lb/hr	3.83E-10	9.92E-10	4.82E-10	6.19E-10
Emission Rate, grams/second	g/s	4.83E-11	1.25E-10	6.07E-11	7.80E-11

Other HpCDF	pg	52.40	79.10	52.80	61.43
Concentration, ng/DSCM	ng/DSCM	1.37E-02	2.13E-02	1.40E-02	1.63E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	2.01E-02	2.78E-02	1.87E-02	2.22E-02
Concen., ng/DSCM @ 7% O2	ng@7%	2.01E-02	2.85E-02	1.91E-02	2.26E-02
Emission Rate, lb/hr	lb/hr	2.23E-09	3.43E-09	2.29E-09	2.65E-09
Emission Rate, grams/second	g/s	2.81E-10	4.32E-10	2.89E-10	3.34E-10

OCDF	pg	41.50	66.00	42.70	50.07
Concentration, ng/DSCM	ng/DSCM	1.09E-02	1.78E-02	1.13E-02	1.33E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.59E-02	2.32E-02	1.51E-02	1.81E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.59E-02	2.38E-02	1.55E-02	1.84E-02
Emission Rate, lb/hr	lb/hr	1.77E-09	2.86E-09	1.85E-09	2.16E-09
Emission Rate, grams/second	g/s	2.23E-10	3.60E-10	2.33E-10	2.72E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
Concentration and Emission Rate Summary
Run Number: 2-S-M23-1

Congener	UNITY	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	1	1.35E-01	1.98E-01	1.98E-01	2.20E-08	2.77E-09
1,2,3,7,8-PeCDD	1	2.03E-03	2.97E-03	2.97E-03	3.30E-10	4.16E-11
Other PeCDD	1	1.64E-01	2.40E-01	2.40E-01	2.67E-08	3.37E-09
1,2,3,4,7,8-HxCDD	1	3.22E-03	4.71E-03	4.71E-03	5.24E-10	6.60E-11
1,2,3,6,7,8-HxCDD	1	9.65E-03	1.41E-02	1.41E-02	1.57E-09	1.98E-10
1,2,3,7,8,9-HxCDD	1	5.36E-03	7.85E-03	7.85E-03	8.73E-10	1.10E-10
Other HxCDD	1	2.34E-01	3.43E-01	3.43E-01	3.81E-08	4.81E-09
1,2,3,4,6,7,8-HpCDD	1	7.72E-02	1.13E-01	1.13E-01	1.26E-08	1.58E-09
Other HpCDD	1	7.59E-02	1.11E-01	1.11E-01	1.24E-08	1.56E-09
OCDD	1	1.39E-01	2.03E-01	2.03E-01	2.26E-08	2.85E-09
TOTAL PCDD		8.45E-01	1.24E+00	1.24E+00	1.38E-07	1.73E-08
2,3,7,8-TCDF	1	3.22E-03	4.71E-03	4.71E-03	5.24E-10	6.60E-11
Other TCDF	1	1.24E-01	1.81E-01	1.81E-01	2.01E-08	2.54E-09
1,2,3,7,8-PeCDF	1	4.21E-03	6.16E-03	6.16E-03	6.86E-10	8.64E-11
2,3,4,7,8-PeCDF	1	6.67E-03	9.76E-03	9.76E-03	1.09E-09	1.37E-10
Other PeCDF	1	6.89E-02	1.01E-01	1.01E-01	1.12E-08	1.41E-09
1,2,3,4,7,8-HxCDF	1	5.76E-03	8.42E-03	8.42E-03	9.37E-10	1.18E-10
1,2,3,6,7,8-HxCDF	1	5.99E-03	8.77E-03	8.77E-03	9.76E-10	1.23E-10
2,3,4,6,7,8-HxCDF	1	7.59E-03	1.11E-02	1.11E-02	1.24E-09	1.56E-10
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	4.22E-02	6.17E-02	6.17E-02	6.86E-09	8.65E-10
1,2,3,4,6,7,8-HpCDF	1	1.87E-02	2.74E-02	2.74E-02	3.05E-09	3.84E-10
1,2,3,4,7,8,9-HpCDF	1	2.35E-03	3.45E-03	3.45E-03	3.83E-10	4.83E-11
Other HpCDF	1	1.37E-02	2.01E-02	2.01E-02	2.23E-09	2.81E-10
OCDF	1	1.09E-02	1.59E-02	1.59E-02	1.77E-09	2.23E-10
TOTAL PCDF		3.14E-01	4.59E-01	4.59E-01	5.11E-08	6.44E-09
TOTAL PCDD/PCDF		1.16E+00	1.70E+00	1.70E+00	1.89E-07	2.38E-08

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
Concentration and Emission Rate Summary
 Run Number: 2-S-M23-2

<u>Congener</u>	<u>UNITY</u>	<u>Concentration</u>			<u>Emission Rate</u>	
		<u>ng/DSCM</u>	<u>ng@12%</u>	<u>ng@7%</u>	<u>lb/hr</u>	<u>grams/sec</u>
2,3,7,8-TCDD	1	2.02E-03	2.63E-03	2.69E-03	3.24E-10	4.08E-11
Other TCDD	1	1.60E-01	2.08E-01	2.13E-01	2.57E-08	3.23E-09
1,2,3,7,8-PeCDD	1	3.93E-03	5.13E-03	5.26E-03	6.32E-10	7.97E-11
Other PeCDD	1	1.68E-01	2.20E-01	2.25E-01	2.71E-08	3.41E-09
1,2,3,4,7,8-HxCDD	1	4.07E-03	5.31E-03	5.44E-03	6.54E-10	8.24E-11
1,2,3,6,7,8-HxCDD	1	1.19E-02	1.55E-02	1.59E-02	1.91E-09	2.41E-10
1,2,3,7,8,9-HxCDD	1	7.35E-03	9.59E-03	9.83E-03	1.18E-09	1.49E-10
Other HxCDD	1	2.49E-01	3.25E-01	3.33E-01	4.00E-08	5.04E-09
1,2,3,4,6,7,8-HpCDD	1	8.94E-02	1.17E-01	1.20E-01	1.44E-08	1.81E-09
Other HpCDD	1	8.46E-02	1.10E-01	1.13E-01	1.36E-08	1.71E-09
OCDD	1	1.53E-01	2.00E-01	2.05E-01	2.46E-08	3.10E-09
TOTAL PCDD		9.33E-01	1.22E+00	1.25E+00	1.50E-07	1.89E-08
2,3,7,8-TCDF	1	9.94E-03	1.30E-02	1.33E-02	1.60E-09	2.01E-10
Other TCDF	1	2.34E-01	3.06E-01	3.13E-01	3.77E-08	4.75E-09
1,2,3,7,8-PeCDF	1	1.34E-02	1.75E-02	1.80E-02	2.16E-09	2.72E-10
2,3,4,7,8-PeCDF	1	1.43E-02	1.86E-02	1.91E-02	2.30E-09	2.89E-10
Other PeCDF	1	1.50E-01	1.96E-01	2.01E-01	2.42E-08	3.05E-09
1,2,3,4,7,8-HxCDF	1	1.39E-02	1.81E-02	1.85E-02	2.23E-09	2.81E-10
1,2,3,6,7,8-HxCDF	1	1.48E-02	1.93E-02	1.98E-02	2.38E-09	3.00E-10
2,3,4,6,7,8-HxCDF	1	1.31E-02	1.70E-02	1.75E-02	2.10E-09	2.65E-10
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	7.60E-02	9.91E-02	1.02E-01	1.22E-08	1.54E-09
1,2,3,4,6,7,8-HpCDF	1	3.10E-02	4.04E-02	4.14E-02	4.98E-09	6.27E-10
1,2,3,4,7,8,9-HpCDF	1	6.17E-03	8.05E-03	8.25E-03	9.92E-10	1.25E-10
Other HpCDF	1	2.13E-02	2.78E-02	2.85E-02	3.43E-09	4.32E-10
OCDF	1	1.78E-02	2.32E-02	2.38E-02	2.86E-09	3.60E-10
TOTAL PCDF		6.16E-01	8.04E-01	8.24E-01	9.91E-08	1.25E-08
TOTAL PCDD/PCDF		1.55E+00	2.02E+00	2.07E+00	2.49E-07	3.14E-08

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
 Concentration and Emission Rate Summary
 Run Number: 2-S-M23-3

Congener	UNITY	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	5.84E-04	7.79E-04	7.96E-04	9.54E-11	1.20E-11
Other TCDD	1	1.69E-01	2.25E-01	2.30E-01	2.75E-08	3.47E-09
1,2,3,7,8-PeCDD	1	2.90E-03	3.86E-03	3.95E-03	4.73E-10	5.96E-11
Other PeCDD	1	1.84E-01	2.45E-01	2.50E-01	3.00E-08	3.78E-09
1,2,3,4,7,8-HxCDD	1	2.63E-03	3.51E-03	3.58E-03	4.30E-10	5.41E-11
1,2,3,6,7,8-HxCDD	1	1.09E-02	1.45E-02	1.48E-02	1.78E-09	2.24E-10
1,2,3,7,8,9-HxCDD	1	5.29E-03	7.05E-03	7.20E-03	8.63E-10	1.09E-10
Other HxCDD	1	2.60E-01	3.47E-01	3.54E-01	4.25E-08	5.35E-09
1,2,3,4,6,7,8-HpCDD	1	8.21E-02	1.09E-01	1.12E-01	1.34E-08	1.69E-09
Other HpCDD	1	7.84E-02	1.04E-01	1.07E-01	1.28E-08	1.61E-09
OCDD	1	1.40E-01	1.86E-01	1.90E-01	2.28E-08	2.88E-09
TOTAL PCDD		9.35E-01	1.25E+00	1.27E+00	1.53E-07	1.92E-08
2,3,7,8-TCDF	1	4.22E-03	5.63E-03	5.76E-03	6.90E-10	8.69E-11
Other TCDF	1	1.40E-01	1.87E-01	1.91E-01	2.29E-08	2.89E-09
1,2,3,7,8-PeCDF	1	4.99E-03	6.66E-03	6.81E-03	8.16E-10	1.03E-10
2,3,4,7,8-PeCDF	1	7.68E-03	1.02E-02	1.05E-02	1.25E-09	1.58E-10
Other PeCDF	1	7.50E-02	1.00E-01	1.02E-01	1.22E-08	1.54E-09
1,2,3,4,7,8-HxCDF	1	6.16E-03	8.22E-03	8.40E-03	1.01E-09	1.27E-10
1,2,3,6,7,8-HxCDF	1	6.37E-03	8.50E-03	8.69E-03	1.04E-09	1.31E-10
2,3,4,6,7,8-HxCDF	1	8.26E-03	1.10E-02	1.13E-02	1.35E-09	1.70E-10
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	4.80E-02	6.40E-02	6.54E-02	7.84E-09	9.88E-10
1,2,3,4,6,7,8-HpCDF	1	1.70E-02	2.27E-02	2.32E-02	2.78E-09	3.50E-10
1,2,3,4,7,8,9-HpCDF	1	2.95E-03	3.93E-03	4.02E-03	4.82E-10	6.07E-11
Other HpCDF	1	1.40E-02	1.87E-02	1.91E-02	2.29E-09	2.89E-10
OCDF	1	1.13E-02	1.51E-02	1.55E-02	1.85E-09	2.33E-10
TOTAL PCDF		3.46E-01	4.62E-01	4.72E-01	5.66E-08	7.13E-09
TOTAL PCDD/PCDF		1.28E+00	1.71E+00	1.75E+00	2.09E-07	2.64E-08

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls

Unit 2 Stack
Average Concentration and Emission Rate Summary

<u>Congener</u>	<u>UNITY</u>	----- Concentration -----			--- Emission Rate ---	
		<u>ng/DSCM</u>	<u>ng@12%</u>	<u>ng@7%</u>	<u>lb/hr</u>	<u>grams/sec</u>
2,3,7,8-TCDD	1	8.66E-04	1.14E-03	1.16E-03	1.40E-10	1.76E-11
Other TCDD	1	1.54E-01	2.10E-01	2.14E-01	2.51E-08	3.16E-09
1,2,3,7,8-PeCDD	1	2.95E-03	3.99E-03	4.06E-03	4.78E-10	6.03E-11
Other PeCDD	1	1.72E-01	2.35E-01	2.38E-01	2.79E-08	3.52E-09
1,2,3,4,7,8-HxCDD	1	3.31E-03	4.51E-03	4.58E-03	5.36E-10	6.75E-11
1,2,3,6,7,8-HxCDD	1	1.08E-02	1.47E-02	1.49E-02	1.75E-09	2.21E-10
1,2,3,7,8,9-HxCDD	1	6.00E-03	8.16E-03	8.29E-03	9.73E-10	1.23E-10
Other HxCDD	1	2.48E-01	3.38E-01	3.43E-01	4.02E-08	5.07E-09
1,2,3,4,6,7,8-HpCDD	1	8.29E-02	1.13E-01	1.15E-01	1.35E-08	1.69E-09
Other HpCDD	1	7.96E-02	1.09E-01	1.10E-01	1.29E-08	1.63E-09
OCDD	1	1.44E-01	1.96E-01	1.99E-01	2.33E-08	2.94E-09
TOTAL PCDD		9.05E-01	1.23E+00	1.25E+00	1.47E-07	1.85E-08
2,3,7,8-TCDF	1	5.79E-03	7.77E-03	7.92E-03	9.37E-10	1.18E-10
Other TCDF	1	1.66E-01	2.25E-01	2.28E-01	2.69E-08	3.39E-09
1,2,3,7,8-PeCDF	1	7.55E-03	1.01E-02	1.03E-02	1.22E-09	1.54E-10
2,3,4,7,8-PeCDF	1	9.54E-03	1.29E-02	1.31E-02	1.55E-09	1.95E-10
Other PeCDF	1	9.81E-02	1.32E-01	1.35E-01	1.59E-08	2.00E-09
1,2,3,4,7,8-HxCDF	1	8.60E-03	1.16E-02	1.18E-02	1.39E-09	1.75E-10
1,2,3,6,7,8-HxCDF	1	9.06E-03	1.22E-02	1.24E-02	1.47E-09	1.85E-10
2,3,4,6,7,8-HxCDF	1	9.64E-03	1.31E-02	1.33E-02	1.56E-09	1.97E-10
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	5.54E-02	7.49E-02	7.62E-02	8.97E-09	1.13E-09
1,2,3,4,6,7,8-HpCDF	1	2.22E-02	3.02E-02	3.07E-02	3.60E-09	4.54E-10
1,2,3,4,7,8,9-HpCDF	1	3.82E-03	5.14E-03	5.24E-03	6.19E-10	7.80E-11
Other HpCDF	1	1.63E-02	2.22E-02	2.26E-02	2.65E-09	3.34E-10
OCDF	1	1.33E-02	1.81E-02	1.84E-02	2.16E-09	2.72E-10
TOTAL PCDF		4.26E-01	5.75E-01	5.85E-01	6.89E-08	8.68E-09
TOTAL PCDD/PCDF		1.33E+00	1.81E+00	1.84E+00	2.16E-07	2.72E-08

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls Page 10 of 10

**Unit 2 Stack
Concentration and Emission Rate Summary
Run Number: 2-S-M23-1**

Congener	1985 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0.01	1.35E-03	1.98E-03	1.98E-03	2.20E-10	2.77E-11
1,2,3,7,8-PeCDD	0.5	1.01E-03	1.48E-03	1.48E-03	1.65E-10	2.08E-11
Other PeCDD	0.005	8.21E-04	1.20E-03	1.20E-03	1.34E-10	1.68E-11
1,2,3,4,7,8-HxCDD	0.04	1.29E-04	1.88E-04	1.88E-04	2.10E-11	2.64E-12
1,2,3,6,7,8-HxCDD	0.04	3.86E-04	5.65E-04	5.65E-04	6.29E-11	7.92E-12
1,2,3,7,8,9-HxCDD	0.04	2.15E-04	3.14E-04	3.14E-04	3.49E-11	4.40E-12
Other HxCDD	0.0004	9.37E-05	1.37E-04	1.37E-04	1.53E-11	1.92E-12
1,2,3,4,6,7,8-HpCDD	0.001	7.72E-05	1.13E-04	1.13E-04	1.26E-11	1.58E-12
Other HpCDD	0.00001	7.59E-07	1.11E-06	1.11E-06	1.24E-13	1.56E-14
OCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDD		4.09E-03	5.98E-03	5.98E-03	6.65E-10	8.38E-11
2,3,7,8-TCDF	0.1	3.22E-04	4.71E-04	4.71E-04	5.24E-11	6.60E-12
Other TCDF	0.001	1.24E-04	1.81E-04	1.81E-04	2.01E-11	2.54E-12
1,2,3,7,8-PeCDF	0.1	4.21E-04	6.16E-04	6.16E-04	6.86E-11	8.64E-12
2,3,4,7,8-PeCDF	0.1	6.67E-04	9.76E-04	9.76E-04	1.09E-10	1.37E-11
Other PeCDF	0.001	6.89E-05	1.01E-04	1.01E-04	1.12E-11	1.41E-12
1,2,3,4,7,8-HxCDF	0.01	5.76E-05	8.42E-05	8.42E-05	9.37E-12	1.18E-12
1,2,3,6,7,8-HxCDF	0.01	5.99E-05	8.77E-05	8.77E-05	9.76E-12	1.23E-12
2,3,4,6,7,8-HxCDF	0.01	7.59E-05	1.11E-04	1.11E-04	1.24E-11	1.56E-12
1,2,3,7,8,9-HxCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0.0001	4.22E-06	6.17E-06	6.17E-06	6.86E-13	8.65E-14
1,2,3,4,6,7,8-HpCDF	0.001	1.87E-05	2.74E-05	2.74E-05	3.05E-12	3.84E-13
1,2,3,4,7,8,9-HpCDF	0.001	2.35E-06	3.45E-06	3.45E-06	3.83E-13	4.83E-14
Other HpCDF	0.00001	1.37E-07	2.01E-07	2.01E-07	2.23E-14	2.81E-15
OCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		1.82E-03	2.67E-03	2.67E-03	2.97E-10	3.74E-11
TOTAL PCDD/PCDF		5.91E-03	8.65E-03	8.64E-03	9.62E-10	1.21E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
 Concentration and Emission Rate Summary
 Run Number: 2-S-M23-2

Congener	1985 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	2.02E-03	2.63E-03	2.69E-03	3.24E-10	4.08E-11
Other TCDD	0.01	1.60E-03	2.08E-03	2.13E-03	2.57E-10	3.23E-11
1,2,3,7,8-PeCDD	0.5	1.97E-03	2.57E-03	2.63E-03	3.16E-10	3.98E-11
Other PeCDD	0.005	8.42E-04	1.10E-03	1.13E-03	1.35E-10	1.71E-11
1,2,3,4,7,8-HxCDD	0.04	1.63E-04	2.12E-04	2.17E-04	2.62E-11	3.30E-12
1,2,3,6,7,8-HxCDD	0.04	4.75E-04	6.20E-04	6.35E-04	7.64E-11	9.62E-12
1,2,3,7,8,9-HxCDD	0.04	2.94E-04	3.84E-04	3.93E-04	4.73E-11	5.96E-12
Other HxCDD	0.0004	9.95E-05	1.30E-04	1.33E-04	1.60E-11	2.02E-12
1,2,3,4,6,7,8-HpCDD	0.001	8.94E-05	1.17E-04	1.20E-04	1.44E-11	1.81E-12
Other HpCDD	0.00001	8.46E-07	1.10E-06	1.13E-06	1.36E-13	1.71E-14
OCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDD		7.54E-03	9.84E-03	1.01E-02	1.21E-09	1.53E-10
2,3,7,8-TCDF	0.1	9.94E-04	1.30E-03	1.33E-03	1.60E-10	2.01E-11
Other TCDF	0.001	2.34E-04	3.06E-04	3.13E-04	3.77E-11	4.75E-12
1,2,3,7,8-PeCDF	0.1	1.34E-03	1.75E-03	1.80E-03	2.16E-10	2.72E-11
2,3,4,7,8-PeCDF	0.1	1.43E-03	1.86E-03	1.91E-03	2.30E-10	2.89E-11
Other PeCDF	0.001	1.50E-04	1.96E-04	2.01E-04	2.42E-11	3.05E-12
1,2,3,4,7,8-HxCDF	0.01	1.39E-04	1.81E-04	1.85E-04	2.23E-11	2.81E-12
1,2,3,6,7,8-HxCDF	0.01	1.48E-04	1.93E-04	1.98E-04	2.38E-11	3.00E-12
2,3,4,6,7,8-HxCDF	0.01	1.31E-04	1.70E-04	1.75E-04	2.10E-11	2.65E-12
1,2,3,7,8,9-HxCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0.0001	7.60E-06	9.91E-06	1.02E-05	1.22E-12	1.54E-13
1,2,3,4,6,7,8-HpCDF	0.001	3.10E-05	4.04E-05	4.14E-05	4.98E-12	6.27E-13
1,2,3,4,7,8,9-HpCDF	0.001	6.17E-06	8.05E-06	8.25E-06	9.92E-13	1.25E-13
Other HpCDF	0.00001	2.13E-07	2.78E-07	2.85E-07	3.43E-14	4.32E-15
OCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		4.61E-03	6.02E-03	6.17E-03	7.42E-10	9.34E-11
TOTAL PCDD/PCDF		1.22E-02	1.59E-02	1.62E-02	1.95E-09	2.46E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
Concentration and Emission Rate Summary
Run Number: 2-S-M23-3

Congener	1985 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	5.84E-04	7.79E-04	7.96E-04	9.54E-11	1.20E-11
Other TCDD	0.01	1.69E-03	2.25E-03	2.30E-03	2.75E-10	3.47E-11
1,2,3,7,8-PeCDD	0.5	1.45E-03	1.93E-03	1.97E-03	2.36E-10	2.98E-11
Other PeCDD	0.005	9.18E-04	1.22E-03	1.25E-03	1.50E-10	1.89E-11
1,2,3,4,7,8-HxCDD	0.04	1.05E-04	1.40E-04	1.43E-04	1.72E-11	2.16E-12
1,2,3,6,7,8-HxCDD	0.04	4.36E-04	5.81E-04	5.94E-04	7.12E-11	8.97E-12
1,2,3,7,8,9-HxCDD	0.04	2.11E-04	2.82E-04	2.88E-04	3.45E-11	4.35E-12
Other HxCDD	0.0004	1.04E-04	1.39E-04	1.42E-04	1.70E-11	2.14E-12
1,2,3,4,6,7,8-HpCDD	0.001	8.21E-05	1.09E-04	1.12E-04	1.34E-11	1.69E-12
Other HpCDD	0.00001	7.84E-07	1.04E-06	1.07E-06	1.28E-13	1.61E-14
OCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDD		5.58E-03	7.43E-03	7.60E-03	9.11E-10	1.15E-10
2,3,7,8-TCDF	0.1	4.22E-04	5.63E-04	5.76E-04	6.90E-11	8.69E-12
Other TCDF	0.001	1.40E-04	1.87E-04	1.91E-04	2.29E-11	2.89E-12
1,2,3,7,8-PeCDF	0.1	4.99E-04	6.66E-04	6.81E-04	8.16E-11	1.03E-11
2,3,4,7,8-PeCDF	0.1	7.68E-04	1.02E-03	1.05E-03	1.25E-10	1.58E-11
Other PeCDF	0.001	7.50E-05	1.00E-04	1.02E-04	1.22E-11	1.54E-12
1,2,3,4,7,8-HxCDF	0.01	6.16E-05	8.22E-05	8.40E-05	1.01E-11	1.27E-12
1,2,3,6,7,8-HxCDF	0.01	6.37E-05	8.50E-05	8.69E-05	1.04E-11	1.31E-12
2,3,4,6,7,8-HxCDF	0.01	8.26E-05	1.10E-04	1.13E-04	1.35E-11	1.70E-12
1,2,3,7,8,9-HxCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0.0001	4.80E-06	6.40E-06	6.54E-06	7.84E-13	9.88E-14
1,2,3,4,6,7,8-HpCDF	0.001	1.70E-05	2.27E-05	2.32E-05	2.78E-12	3.50E-13
1,2,3,4,7,8,9-HpCDF	0.001	2.95E-06	3.93E-06	4.02E-06	4.82E-13	6.07E-14
Other HpCDF	0.00001	1.40E-07	1.87E-07	1.91E-07	2.29E-14	2.89E-15
OCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		2.14E-03	2.85E-03	2.91E-03	3.49E-10	4.40E-11
TOTAL PCDD/PCDF		7.71E-03	1.03E-02	1.05E-02	1.26E-09	1.59E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
Average Concentration and Emission Rate Summary

Congener	1985 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	8.66E-04	1.14E-03	1.16E-03	1.40E-10	1.76E-11
Other TCDD	0.01	1.54E-03	2.10E-03	2.14E-03	2.51E-10	3.16E-11
1,2,3,7,8-PeCDD	0.5	1.48E-03	1.99E-03	2.03E-03	2.39E-10	3.01E-11
Other PeCDD	0.005	8.60E-04	1.17E-03	1.19E-03	1.40E-10	1.76E-11
1,2,3,4,7,8-HxCDD	0.04	1.32E-04	1.80E-04	1.83E-04	2.14E-11	2.70E-12
1,2,3,6,7,8-HxCDD	0.04	4.32E-04	5.89E-04	5.98E-04	7.01E-11	8.84E-12
1,2,3,7,8,9-HxCDD	0.04	2.40E-04	3.27E-04	3.32E-04	3.89E-11	4.90E-12
Other HxCDD	0.0004	9.91E-05	1.35E-04	1.37E-04	1.61E-11	2.03E-12
1,2,3,4,6,7,8-HpCDD	0.001	8.29E-05	1.13E-04	1.15E-04	1.35E-11	1.69E-12
Other HpCDD	0.00001	7.96E-07	1.09E-06	1.10E-06	1.29E-13	1.63E-14
OCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDD		5.73E-03	7.75E-03	7.89E-03	9.29E-10	1.17E-10
2,3,7,8-TCDF	0.1	5.79E-04	7.77E-04	7.92E-04	9.37E-11	1.18E-11
Other TCDF	0.001	1.66E-04	2.25E-04	2.28E-04	2.69E-11	3.39E-12
1,2,3,7,8-PeCDF	0.1	7.55E-04	1.01E-03	1.03E-03	1.22E-10	1.54E-11
2,3,4,7,8-PeCDF	0.1	9.54E-04	1.29E-03	1.31E-03	1.55E-10	1.95E-11
Other PeCDF	0.001	9.81E-05	1.32E-04	1.35E-04	1.59E-11	2.00E-12
1,2,3,4,7,8-HxCDF	0.01	8.60E-05	1.16E-04	1.18E-04	1.39E-11	1.75E-12
1,2,3,6,7,8-HxCDF	0.01	9.06E-05	1.22E-04	1.24E-04	1.47E-11	1.85E-12
2,3,4,6,7,8-HxCDF	0.01	9.64E-05	1.31E-04	1.33E-04	1.56E-11	1.97E-12
1,2,3,7,8,9-HxCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0.0001	5.54E-06	7.49E-06	7.62E-06	8.97E-13	1.13E-13
1,2,3,4,6,7,8-HpCDF	0.001	2.22E-05	3.02E-05	3.07E-05	3.60E-12	4.54E-13
1,2,3,4,7,8,9-HpCDF	0.001	3.82E-06	5.14E-06	5.24E-06	6.19E-13	7.80E-14
Other HpCDF	0.00001	1.63E-07	2.22E-07	2.26E-07	2.65E-14	3.34E-15
OCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		2.86E-03	3.84E-03	3.91E-03	4.62E-10	5.83E-11
TOTAL PCDD/PCDF		8.59E-03	1.16E-02	1.18E-02	1.39E-09	1.75E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

**Unit 2 Stack
Concentration and Emission Rate Summary
Run Number: 2-S-M23-1**

Congener	1989 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	1.01E-03	1.48E-03	1.48E-03	1.65E-10	2.08E-11
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	3.22E-04	4.71E-04	4.71E-04	5.24E-11	6.60E-12
1,2,3,6,7,8-HxCDD	0.1	9.65E-04	1.41E-03	1.41E-03	1.57E-10	1.98E-11
1,2,3,7,8,9-HxCDD	0.1	5.36E-04	7.85E-04	7.85E-04	8.73E-11	1.10E-11
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	7.72E-04	1.13E-03	1.13E-03	1.26E-10	1.58E-11
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	1.39E-04	2.03E-04	2.03E-04	2.26E-11	2.85E-12
TOTAL PCDD		3.75E-03	5.49E-03	5.48E-03	6.10E-10	7.69E-11
2,3,7,8-TCDF	0.1	3.22E-04	4.71E-04	4.71E-04	5.24E-11	6.60E-12
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	2.11E-04	3.08E-04	3.08E-04	3.43E-11	4.32E-12
2,3,4,7,8-PeCDF	0.5	3.34E-03	4.88E-03	4.88E-03	5.43E-10	6.85E-11
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	5.76E-04	8.42E-04	8.42E-04	9.37E-11	1.18E-11
1,2,3,6,7,8-HxCDF	0.1	5.99E-04	8.77E-04	8.77E-04	9.76E-11	1.23E-11
2,3,4,6,7,8-HxCDF	0.1	7.59E-04	1.11E-03	1.11E-03	1.24E-10	1.56E-11
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	1.87E-04	2.74E-04	2.74E-04	3.05E-11	3.84E-12
1,2,3,4,7,8,9-HpCDF	0.01	2.35E-05	3.45E-05	3.45E-05	3.83E-12	4.83E-13
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDF	0.001	1.09E-05	1.59E-05	1.59E-05	1.77E-12	2.23E-13
TOTAL PCDF		6.02E-03	8.82E-03	8.81E-03	9.81E-10	1.24E-10
TOTAL PCDD/PCDF		9.77E-03	1.43E-02	1.43E-02	1.59E-09	2.01E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
 Concentration and Emission Rate Summary
 Run Number: 2-S-M23-2

Congener	1989 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	2.02E-03	2.63E-03	2.69E-03	3.24E-10	4.08E-11
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	1.97E-03	2.57E-03	2.63E-03	3.16E-10	3.98E-11
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	4.07E-04	5.31E-04	5.44E-04	6.54E-11	8.24E-12
1,2,3,6,7,8-HxCDD	0.1	1.19E-03	1.55E-03	1.59E-03	1.91E-10	2.41E-11
1,2,3,7,8,9-HxCDD	0.1	7.35E-04	9.59E-04	9.83E-04	1.18E-10	1.49E-11
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	8.94E-04	1.17E-03	1.20E-03	1.44E-10	1.81E-11
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	1.53E-04	2.00E-04	2.05E-04	2.46E-11	3.10E-12
TOTAL PCDD		7.36E-03	9.60E-03	9.84E-03	1.18E-09	1.49E-10
2,3,7,8-TCDF	0.1	9.94E-04	1.30E-03	1.33E-03	1.60E-10	2.01E-11
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	6.72E-04	8.77E-04	8.98E-04	1.08E-10	1.36E-11
2,3,4,7,8-PeCDF	0.5	7.14E-03	9.31E-03	9.54E-03	1.15E-09	1.45E-10
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	1.39E-03	1.81E-03	1.85E-03	2.23E-10	2.81E-11
1,2,3,6,7,8-HxCDF	0.1	1.48E-03	1.93E-03	1.98E-03	2.38E-10	3.00E-11
2,3,4,6,7,8-HxCDF	0.1	1.31E-03	1.70E-03	1.75E-03	2.10E-10	2.65E-11
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	3.10E-04	4.04E-04	4.14E-04	4.98E-11	6.27E-12
1,2,3,4,7,8,9-HpCDF	0.01	6.17E-05	8.05E-05	8.25E-05	9.92E-12	1.25E-12
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDF	0.001	1.78E-05	2.32E-05	2.38E-05	2.86E-12	3.60E-13
TOTAL PCDF		1.34E-02	1.74E-02	1.79E-02	2.15E-09	2.71E-10
TOTAL PCDD/PCDF		2.07E-02	2.70E-02	2.77E-02	3.33E-09	4.20E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit 2 Stack
Concentration and Emission Rate Summary
Run Number: 2-S-M23-3

Congener	1989 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	5.84E-04	7.79E-04	7.96E-04	9.54E-11	1.20E-11
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	1.45E-03	1.93E-03	1.97E-03	2.36E-10	2.98E-11
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	2.63E-04	3.51E-04	3.58E-04	4.30E-11	5.41E-12
1,2,3,6,7,8-HxCDD	0.1	1.09E-03	1.45E-03	1.48E-03	1.78E-10	2.24E-11
1,2,3,7,8,9-HxCDD	0.1	5.29E-04	7.05E-04	7.20E-04	8.63E-11	1.09E-11
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	8.21E-04	1.09E-03	1.12E-03	1.34E-10	1.69E-11
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	1.40E-04	1.86E-04	1.90E-04	2.28E-11	2.88E-12
TOTAL PCDD		4.87E-03	6.50E-03	6.64E-03	7.96E-10	1.00E-10
2,3,7,8-TCDF	0.1	4.22E-04	5.63E-04	5.76E-04	6.90E-11	8.69E-12
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	2.50E-04	3.33E-04	3.40E-04	4.08E-11	5.14E-12
2,3,4,7,8-PeCDF	0.5	3.84E-03	5.12E-03	5.23E-03	6.27E-10	7.90E-11
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	6.16E-04	8.22E-04	8.40E-04	1.01E-10	1.27E-11
1,2,3,6,7,8-HxCDF	0.1	6.37E-04	8.50E-04	8.69E-04	1.04E-10	1.31E-11
2,3,4,6,7,8-HxCDF	0.1	8.26E-04	1.10E-03	1.13E-03	1.35E-10	1.70E-11
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	1.70E-04	2.27E-04	2.32E-04	2.78E-11	3.50E-12
1,2,3,4,7,8,9-HpCDF	0.01	2.95E-05	3.93E-05	4.02E-05	4.82E-12	6.07E-13
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDF	0.001	1.13E-05	1.51E-05	1.55E-05	1.85E-12	2.33E-13
TOTAL PCDF		6.80E-03	9.07E-03	9.27E-03	1.11E-09	1.40E-10
TOTAL PCDD/PCDF		1.17E-02	1.56E-02	1.59E-02	1.91E-09	2.40E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
 2-S-M23-123.xls Page 8 of 10

Unit 2 Stack
Average Concentration and Emission Rate Summary

Congener	1989 ITEF	----- Concentration -----			--- Emission Rate ---	
		ng/DSCM	ng@12%	ng@7%	lb/hr	grams/sec
2,3,7,8-TCDD	1	8.66E-04	1.14E-03	1.16E-03	1.40E-10	1.76E-11
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	1.48E-03	1.99E-03	2.03E-03	2.39E-10	3.01E-11
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	3.31E-04	4.51E-04	4.58E-04	5.36E-11	6.75E-12
1,2,3,6,7,8-HxCDD	0.1	1.08E-03	1.47E-03	1.49E-03	1.75E-10	2.21E-11
1,2,3,7,8,9-HxCDD	0.1	6.00E-04	8.16E-04	8.29E-04	9.73E-11	1.23E-11
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	8.29E-04	1.13E-03	1.15E-03	1.35E-10	1.69E-11
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	1.44E-04	1.96E-04	1.99E-04	2.33E-11	2.94E-12
TOTAL PCDD		5.33E-03	7.19E-03	7.32E-03	8.63E-10	1.09E-10
2,3,7,8-TCDF	0.1	5.79E-04	7.77E-04	7.92E-04	9.37E-11	1.18E-11
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	3.77E-04	5.06E-04	5.16E-04	6.10E-11	7.69E-12
2,3,4,7,8-PeCDF	0.5	4.77E-03	6.44E-03	6.55E-03	7.73E-10	9.73E-11
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	8.60E-04	1.16E-03	1.18E-03	1.39E-10	1.75E-11
1,2,3,6,7,8-HxCDF	0.1	9.06E-04	1.22E-03	1.24E-03	1.47E-10	1.85E-11
2,3,4,6,7,8-HxCDF	0.1	9.64E-04	1.31E-03	1.33E-03	1.56E-10	1.97E-11
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	2.22E-04	3.02E-04	3.07E-04	3.60E-11	4.54E-12
1,2,3,4,7,8,9-HpCDF	0.01	3.82E-05	5.14E-05	5.24E-05	6.19E-12	7.80E-13
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDF	0.001	1.33E-05	1.81E-05	1.84E-05	2.16E-12	2.72E-13
TOTAL PCDF		8.73E-03	1.18E-02	1.20E-02	1.41E-09	1.78E-10
TOTAL PCDD/PCDF		1.41E-02	1.90E-02	1.93E-02	2.28E-09	2.87E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg
2-S-M23-123.xls

**APPENDIX A.8
Test Results**

**Unit 2 Stack
Hydrogen Chloride**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

M26

Client Name	Covanta Energy Group, Inc.	Operator	JMA
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-S-MM26-1	2-S-MM26-2	2-S-MM26-3	
Run Date	06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm 0907	1036	1225	
Run Stop Time	hh:mm 1016	1136	1325	

Sampling Parameters

Meter Calibration Factor	Y	0.9969	0.9969	0.9969	
Y _{OA} Calculated by Test Run	Y _{OA}	0.9927	0.9869	0.9903	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.90	-0.90	-0.90
Barometric Pressure	in Hg	29.1	29.1	29.1	29.1
Carbon Dioxide Percentage	% CO ₂	9.5	9.5	10.0	9.7
Oxygen Percentage	% O ₂	10.2	10.2	9.7	10.0
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	174.4	176.7	197.7	182.9
Sample Volume	ft ³	41.413	41.699	41.480	41.531
Average Meter Temperature	°F	87	88	87	87
Average Delta H	in H ₂ O	1.40	1.40	1.40	1.40
Total Sampling Time	min	60.0	60.0	60.0	60.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	8.209	8.317	9.306	8.611
Volume Metered @ STP	DSCF	38.913	39.107	38.967	38.995
Absolute Stack/Duct Pressure	in Hg	29.0	29.0	29.0	29.0
Absolute Meter Pressure	in Hg	29.2	29.2	29.2	29.2
Calculated Stack Moisture	% H ₂ O	17.4	17.5	19.3	18.1

Air Flow Rate Results

Dry Standard Stack Flow/Minute	DSCFM	41,992	41,992	40,841	41,608
Air Flow Taken From Test Run ID	NA	2-S-M29-1	2-S-M29-1	2-S-M29-2	NA

Concentration and Emission Rate Data Summary

Hydrogen Chloride	mg	11.7	10.5	14.0	
Molecular Weight	MW	36.46	36.46	36.46	36.46
Concentration, ppm	ppm	7.01	6.26	8.37	7.21
Concentration, ppm @ 12% CO ₂	ppm@12%	8.85	7.90	10.0	8.93
Concentration, ppm @ 7% O ₂	ppm@7%	9.10	8.13	10.4	9.20
Emission Rate, lb/hr	lb/hr	1.67	1.49	1.94	1.70

Removal Efficiency Summary For: HCl

Unit #	Repetition Number	ppm @ 7% O2		Removal Efficiency, %
		Inlet Result	Stack Result	
2	1	577	9.10	98.4%
	2	589	8.13	98.6%
	3	752	10.4	98.6%
	AVERAGE =>			98.6%

**APPENDIX A.9
Test Results**

**Unit 2 Stack
Particulate and Metals**

RECEIVED
MAR 20 2015
AIR QUALITY DIV.

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

29

Client Name	Covanta Energy Group, Inc.	Operator	CAN
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-S-M29-1	2-S-M29-2	2-S-M29-3	
Run Date	06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm 0906	1224	1511	
Run Stop Time	hh:mm 1132	1432	1727	

Sampling Parameters

Meter Calibration Factor	Y	1.0186	1.0186	1.0186	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0066	1.0124	1.0058	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.90	-0.90	-0.90
Stack Cross-Sectional Area	ft ²	16.499	16.499	16.499	16.499
Barometric Pressure	in Hg	29.1	29.1	29.1	29.1
Actual Nozzle Diameter	in	0.212	0.216	0.212	
Carbon Dioxide Percentage	% CO ₂	9.5	10.0	9.8	9.8
Oxygen Percentage	% O ₂	10.2	9.7	9.9	9.9
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	340.5	426.4	346.6	371.2
Sample Volume	ft ³	80.283	83.048	80.090	81.140
Average Meter Temperature	°F	91	90	95	92
Average Stack Temperature	°F	307	308	309	308
Average Delta H	in H ₂ O	1.26	1.37	1.25	1.29
Total Sampling Time	min	120.0	120.0	120.0	120.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	16.027	20.071	16.314	17.471
Volume Metered @ STP	DSCF	76.445	79.171	75.754	77.123
Absolute Stack/Duct Pressure	in Hg	29.0	29.0	29.0	29.0
Absolute Meter Pressure	in Hg	29.2	29.2	29.2	29.2
Calculated Stack Moisture	% H ₂ O	17.3	20.2	17.7	18.4
Dry Mole Fraction	decimal	0.827	0.798	0.823	0.816
Avg Square of Differential Pressure	in H ₂ O	1.098	1.102	1.091	1.097
Avg Square of Diff. Pres., Squared	in H ₂ O	1.206	1.214	1.191	1.204
Dry Gas Molecular Weight	lb/lb-mole	29.93	29.99	29.96	29.96
Wet Stack Gas Molecular Weight	lb/lb-mole	27.86	27.56	27.84	27.76
Average Stack Gas Velocity	ft/sec	76.76	77.50	76.43	76.90
Percent of Isokinetic Rate	% ISO	102.2	104.8	102.5	103.1

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	75,991	76,721	75,658	76,123
Dry Standard Stack Flow/Minute	DSCFM	41,992	40,841	41,481	41,438
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	32,324	32,908	32,827	32,686

Concentration and Emission Rate Data Summary						
Filterable Particulate	mg	1.3	2.1	3.2		2.2
Concentration, Gr/DSCF	gr/DSCF	2.62E-04	4.09E-04	6.52E-04		4.41E-04
Concentration, Gr/DSCF @ 12% CO ₂	Gr@12%	3.32E-04	4.91E-04	7.98E-04		5.40E-04
Concentration, Gr/DSCF @ 7% O ₂	Gr@7%	3.41E-04	5.08E-04	8.24E-04		5.58E-04
Concentration, mg/DSCM	mg/DSCM	0.600	0.937	1.49		1.01
Concentration, mg/DSCM @ 7% O ₂	mg@7%	0.780	1.16	1.88		1.28
Emission Rate, lb/hr	lb/hr	0.0945	0.143	0.232		0.157
Arsenic (As)	ug	1.305	0.418	0.560		0.761
Concentration, ug/DSCM	ug/DSCM	0.603	0.186	0.261		0.350
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	0.761	0.223	0.320		0.435
Concentration, ug/DSCM @ 7% O ₂	ug@7%	0.783	0.231	0.330		0.448
Emission Rate, lb/hr	lb/hr	9.48E-05	2.85E-05	4.06E-05		5.46E-05
Beryllium (Be)	ug	< 0.050	< 0.050	< 0.050		< 0.050
Concentration, ug/DSCM	ug/DSCM	< 0.0231	< 0.0223	< 0.0233		< 0.0229
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	< 0.0292	< 0.0268	< 0.0285		< 0.0282
Concentration, ug/DSCM @ 7% O ₂	ug@7%	< 0.0300	< 0.0277	< 0.0295		< 0.0290
Emission Rate, lb/hr	lb/hr	< 3.63E-06	< 3.41E-06	< 3.62E-06		< 3.56E-06
Cadmium (Cd)	ug	0.868	1.460	1.020		1.116
Concentration, ug/DSCM	ug/DSCM	0.401	0.651	0.475		0.509
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	0.506	0.781	0.582		0.623
Concentration, ug/DSCM @ 7% O ₂	ug@7%	0.521	0.808	0.601		0.643
Emission Rate, lb/hr	lb/hr	6.31E-05	9.96E-05	7.39E-05		7.89E-05
Total Chromium (Cr)	ug	3.020	3.015	2.380		2.805
Concentration, ug/DSCM	ug/DSCM	1.39	1.34	1.11		1.28
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	1.76	1.61	1.36		1.58
Concentration, ug/DSCM @ 7% O ₂	ug@7%	1.81	1.67	1.40		1.63
Emission Rate, lb/hr	lb/hr	2.19E-04	2.06E-04	1.72E-04		1.99E-04
Lead (Pb)	ug	16.570	9.320	10.870		12.253
Concentration, ug/DSCM	ug/DSCM	7.65	4.16	5.07		5.63
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	9.67	4.99	6.20		6.95
Concentration, ug/DSCM @ 7% O ₂	ug@7%	9.94	5.16	6.40		7.17
Emission Rate, lb/hr	lb/hr	1.20E-03	6.36E-04	7.87E-04		8.76E-04
Mercury (Hg)	ug	1.425	1.385	1.520		1.443
Concentration, ug/DSCM	ug/DSCM	0.658	0.618	0.709		0.661
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	0.831	0.741	0.868		0.813
Concentration, ug/DSCM @ 7% O ₂	ug@7%	0.855	0.767	0.895		0.839
Emission Rate, lb/hr	lb/hr	1.04E-04	9.45E-05	1.10E-04		1.03E-04

Removal Efficiency Summary For: Hg

Unit #	Repetition Number	ug/DSCM@7%		Removal Efficiency, %
		Inlet Result	Stack Result	
2	1	107	0.855	99.2%
	2	76.6	0.767	99.0%
	3	94.7	0.895	99.1%
			AVERAGE =>	99.1%

**APPENDIX A.10
Test Results**

**Unit 2 Stack
Sulfuric Acid Mist**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

8

Client Name	Covanta Energy Group, Inc.	Operator	CAN
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-S-M8-1	2-S-M8-2	2-S-M8-3	
Run Date	06/24/14	06/24/14	06/24/14	
Run Start Time	hh:mm 1112	1310	1458	
Run Stop Time	hh:mm 1214	1418	1640	

Sampling Parameters

Meter Calibration Factor	Y	1.0186	1.0186	1.0186	
Y _{OA} Calculated by Test Run	Y _{OA}	1.0104	1.0089	1.0156	
Y _{OA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.90	-0.90	-0.90
Stack Cross-Sectional Area	ft ²	16.499	16.499	16.499	16.499
Barometric Pressure	in Hg	29.2	29.2	29.2	29.2
Actual Nozzle Diameter	in	0.212	0.210	0.212	
Carbon Dioxide Percentage	% CO ₂	8.8	9.0	8.6	8.8
Oxygen Percentage	% O ₂	10.9	10.7	11.0	10.9
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.4	80.3
Total Water Volume Collected	mL	181.1	198.0	196.0	191.7
Sample Volume	ft ³	41.150	41.732	40.870	41.251
Average Meter Temperature	°F	94	96	97	95
Average Delta H	in H ₂ O	1.33	1.36	1.32	1.34
Total Sampling Time	min	60.0	60.0	60.0	60.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	8.524	9.320	9.226	9.023
Volume Metered @ STP	DSCF	39.125	39.509	38.660	39.098
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1	29.1
Absolute Meter Pressure	in Hg	29.3	29.3	29.3	29.3
Calculated Stack Moisture	% H ₂ O	17.9	19.1	19.3	18.7
Saturated Stack Moisture	% H ₂ O	100.0	100.0	100.0	100.0
Reported Stack Moisture Content	% H ₂ O	17.9	19.1	19.3	18.7
Dry Mole Fraction	decimal	0.821	0.809	0.807	0.813
Avg Square of Differential Pressure	in H ₂ O	1.127	1.160	1.122	1.136
Avg Square of Diff. Pres., Squared	in H ₂ O	1.271	1.345	1.258	1.291
Dry Gas Molecular Weight	lb/lb-mole	29.84	29.87	29.82	29.84
Wet Stack Gas Molecular Weight	lb/lb-mole	27.73	27.60	27.54	27.62
Average Stack Gas Velocity	ft/sec	78.97	81.47	79.05	79.83
Percent of Isokinetic Rate	% ISO	102.3	103.6	103.2	103.0

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	78,180	80,653	78,254	79,029
Dry Standard Stack Flow/Minute	DSCFM	42,932	43,606	42,042	42,860
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	30,886	31,999	29,944	30,943

Concentration and Emission Rate Data Summary

Sulfate results with the new "ACCEPTABLE" audit result

Sulfuric Acid Mist (Ion Chromatography)	mg	< 0.037	< 0.034	< 0.030		
Molecular Weight	MW	98.08	98.08	98.08	98.08	
Concentration, ppm	ppm	< 0.0082	< 0.0075	< 0.0067		< 0.0075
Concentration, ppm @ 12% CO ₂	ppm@12%	< 0.0112	< 0.0099	< 0.0094		< 0.0102
Concentration, ppm @ 7% O ₂	ppm@7%	< 0.0114	< 0.0102	< 0.0094		< 0.0103
Concentration, mg/DSCM	mg/DSCM	< 0.0334	< 0.0304	< 0.0274		< 0.0304
Concentration, mg/DSCM @ 12% CO ₂	mg@12%	< 0.0455	< 0.0405	< 0.0382		< 0.0414
Concentration, mg/DSCM @ 7% O ₂	mg@7%	< 0.0464	< 0.0414	< 0.0385		< 0.0421
Emission Rate, lb/hr	lb/hr	< 0.00537	< 0.00496	< 0.00432		< 0.00488

Sulfuric Acid Mist (titration)	mg	< 0.220	< 0.201	< 0.181		
Molecular Weight	MW	98.08	98.08	98.08	98.08	
Concentration, ppm	ppm	< 0.0487	< 0.0441	< 0.0405		< 0.0444
Concentration, ppm @ 12% CO ₂	ppm@12%	< 0.0664	< 0.0587	< 0.0566		< 0.0606
Concentration, ppm @ 7% O ₂	ppm@7%	< 0.0677	< 0.0600	< 0.0569		< 0.0616
Concentration, mg/DSCM	mg/DSCM	< 0.199	< 0.180	< 0.165		< 0.181
Concentration, mg/DSCM @ 12% CO ₂	mg@12%	< 0.271	< 0.240	< 0.231		< 0.247
Concentration, mg/DSCM @ 7% O ₂	mg@7%	< 0.276	< 0.245	< 0.232		< 0.251
Emission Rate, lb/hr	lb/hr	< 0.0319	< 0.0293	< 0.0260		< 0.0291

Sulfate results with the original "UNACCEPTABLE" audit result

Sulfuric Acid Mist (Ion Chromatography)	mg	0.057	< 0.034	< 0.031		
Molecular Weight	MW	98.08	98.08	98.08	98.08	
Concentration, ppm	ppm	< 0.0082	< 0.0075	< 0.0067		< 0.0075
Concentration, ppm @ 12% CO ₂	ppm@12%	< 0.0112	< 0.0099	< 0.0094		< 0.0102
Concentration, ppm @ 7% O ₂	ppm@7%	< 0.0114	< 0.0102	< 0.0094		< 0.0103
Concentration, mg/DSCM	mg/DSCM	< 0.0334	< 0.0304	< 0.0274		< 0.0304
Concentration, mg/DSCM @ 12% CO ₂	mg@12%	< 0.0455	< 0.0405	< 0.0382		< 0.0414
Concentration, mg/DSCM @ 7% O ₂	mg@7%	< 0.0464	< 0.0414	< 0.0385		< 0.0421
Emission Rate, lb/hr	lb/hr	< 0.00537	< 0.00496	< 0.00432		< 0.00488

Sulfuric Acid Mist (titration)	mg	< 0.220	< 0.201	< 0.181		
Molecular Weight	MW	98.08	98.08	98.08	98.08	
Concentration, ppm	ppm	< 0.0487	< 0.0441	< 0.0405		< 0.0444
Concentration, ppm @ 12% CO ₂	ppm@12%	< 0.0664	< 0.0587	< 0.0566		< 0.0606
Concentration, ppm @ 7% O ₂	ppm@7%	< 0.0677	< 0.0600	< 0.0569		< 0.0616
Concentration, mg/DSCM	mg/DSCM	< 0.199	< 0.180	< 0.165		< 0.181
Concentration, mg/DSCM @ 12% CO ₂	mg@12%	< 0.271	< 0.240	< 0.231		< 0.247
Concentration, mg/DSCM @ 7% O ₂	mg@7%	< 0.276	< 0.245	< 0.232		< 0.251
Emission Rate, lb/hr	lb/hr	< 0.0319	< 0.0293	< 0.0260		< 0.0291

**APPENDIX A.11
Test Results**

**Unit 2 Stack
Total Fluorides and Hexavalent Chromium**

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD

13B/425

Client Name	Covanta Energy Group, Inc.	Operator	JMA
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1	SET AVERAGE
Run Number	2-S-M13B/425-1	2-S-M13B/425-2	2-S-M13B/425-3	
Run Date	06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm 0906	1224	1511	
Run Stop Time	hh:mm 1132	1432	1727	

Sampling Parameters

Meter Calibration Factor	Y	0.9825	0.9825	0.9825	
Y _{ca} Calculated by Test Run	Y _{ca}	0.9902	0.9969	0.9926	
Y _{ca} PASS/FAIL by Test Run	Check	PASS	PASS	PASS	PASS
Pitot Tube Coefficient	C _p	0.84	0.84	0.84	
Stack/Duct Static Pressure	in H ₂ O	-0.90	-0.90	-0.90	-0.90
Stack Cross-Sectional Area	ft ²	16.499	16.499	16.499	16.499
Barometric Pressure	in Hg	29.1	29.1	29.1	29.1
Actual Nozzle Diameter	in	0.210	0.214	0.210	
Carbon Dioxide Percentage	% CO ₂	9.5	10.0	9.8	9.8
Oxygen Percentage	% O ₂	10.2	9.7	9.9	9.9
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0	0.0
Nitrogen Percentage	% N ₂	80.3	80.3	80.3	80.3
Total Water Volume Collected	mL	340.0	411.7	350.9	367.5
Sample Volume	ft ³	80.146	84.202	82.180	82.176
Average Meter Temperature	°F	83	85	88	85
Average Delta H	in H ₂ O	1.31	1.46	1.37	1.38
Total Sampling Time	min	120.0	120.0	120.0	120.0

Air Flow Parameters

Volume of Water vapor @ STP	SCF	16.004	19.379	16.517	17.300
Volume Metered @ STP	DSCF	74.744	78.256	75.964	76.321
Absolute Stack/Duct Pressure	in Hg	29.0	29.0	29.0	29.0
Absolute Meter Pressure	in Hg	29.2	29.2	29.2	29.2
Calculated Stack Moisture	% H ₂ O	17.6	19.8	17.9	18.4
Saturated Stack Moisture	% H ₂ O	100.0	100.0	100.0	100.0
Reported Stack Moisture Content	% H ₂ O	17.6	19.8	17.9	18.4
Dry Mole Fraction	decimal	0.824	0.802	0.821	0.816
Avg Square of Differential Pressure	in H ₂ O	1.106	1.126	1.133	1.122
Avg Square of Diff. Pres., Squared	in H ₂ O	1.224	1.269	1.284	1.259
Dry Gas Molecular Weight	lb/lb-mole	29.93	29.99	29.96	29.96
Wet Stack Gas Molecular Weight	lb/lb-mole	27.82	27.61	27.83	27.75
Average Stack Gas Velocity	ft/sec	77.07	78.98	79.13	78.40
Percent of Isokinetic Rate	% ISO	100.9	102.6	100.7	101.4

Air Flow Rate Results

Actual Stack Flow/Minute	ACFM	76,299	78,190	78,333	77,607
Dry Standard Stack Flow/Minute	DSCFM	42,362	42,019	43,155	42,512
Dry Standard Flow/Minute @ 7% O ₂	DSCFM7	32,610	33,857	34,151	33,539

Concentration and Emission Rate Data Summary						
Total Fluorides as Hydrogen Fluoride	mg	< 0.1	< 0.1	< 0.1		
Molecular Weight	MW	20.01	20.01	20.01	20.01	
Concentration, mg/DSCM	mg/DSCM	< 0.0472	< 0.0451	< 0.0465		< 0.0463
Concentration, mg/DSCM @ 12% CO ₂	mg@12%	< 0.0597	< 0.0541	< 0.0569		< 0.0569
Concentration, mg/DSCM @ 7% O ₂	mg@7%	< 0.0614	< 0.0560	< 0.0587		< 0.0587
Emission Rate, lb/hr	lb/hr	< 0.00750	< 0.00710	< 0.00751		< 0.00737
Hexavalent Chromium	ug	< 0.156	< 0.158	< 0.148		
Concentration, ug/DSCM	ug/DSCM	< 0.0737	< 0.0713	< 0.0688		< 0.0713
Concentration, ug/DSCM @ 12% CO ₂	ug@12%	< 0.0931	< 0.0856	< 0.0842		< 0.0876
Concentration, ug/DSCM @ 7% O ₂	ug@7%	< 0.0957	< 0.0885	< 0.0869		< 0.0904
Emission Rate, lb/hr	lb/hr	< 1.17E-05	< 1.12E-05	< 1.11E-05		< 1.13E-05

APPENDIX A.12
Test Results
Unit 2 Stack
Total Hydrocarbons

CONCENTRATION AND EMISSION RATE DATA SUMMARY

Client Name	Covanta Energy Group, Inc.		
Plant Name	Kent County Waste to Energy Facility		
Sampling Location	Unit 2 Stack		
Operator	14016		
Project #	PJJ		

Repetition Number		1	2	3	SET AVERAGE
Run Date		06/24/14	06/24/14	06/24/14	
Run Start Time	hh:mm	1112	1310	1814	
Run Stop Time	hh:mm	1212	1410	1914	

Unit 2 Stack					
Moisture Content	% H ₂ O	17.9	19.1	18.8	18.6
Dry Mole Fraction	Mfd	0.821	0.809	0.812	0.814
Oxygen Percentage	% O ₂	10.754	10.855	10.547	10.719
Oxygen Based F-Factor (Fd)	DSCF/MM	9570	9570	9570	9570
Dry Standard Stack Flow Rate	DSCFM	42,932	43,606	42,532	43,023

Unit 2 Stack					
Total Hydrocarbons (as Methane)					
Formula Weight	Fwt	16.04	16.04	16.04	
Concentration, ppm (wet)	ppmvw	1.812	0.874	0.787	1.158
Concentration, ppm (dry)	ppmvd	2.21	1.08	0.969	1.42
Concentration, ppm@7%O ₂	ppm@7%O ₂	3.02	1.49	1.30	1.94
Concentration, mg/DSCM@7%O ₂	mg/DSCM@7%	2.02	1.00	0.868	1.29
Emission Rate, lb/hr	lb/hr	0.237	0.118	0.103	0.152
Emission Rate, lb/MMBtu (Fd)	lb/MMBtu	0.00181	0.00090	0.00078	0.00116

CONCENTRATION AND EMISSION RATE SUMMARY

Client Name	Covanta Energy Group, Inc.
Plant Name	Kent County Waste to Energy F
Sampling Location	Unit 2 Stack
Operator	14016
Project #	PJJ

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1	
CEM Run Number		3	
Run Date		06/24/14	
Run Start Time	hh:mm	1112	SET AVERAGE
Run Stop Time	hh:mm	1212	

Unit 2 Stack			
Moisture Content	% H ₂ O	17.9	17.9
Dry Mole Fraction	Mfd	0.821	0.821
Oxygen Percentage	% O ₂	10.754	10.754
Oxygen Based F-Factor (Fd)	DSCF/MM	9570	9570
Dry Standard Stack Flow Rate	DSCFM	42,932	42,932
Air Flow and Moisture Taken From Test Run =>		2-S-M8-1	

Unit 2 Stack			
Total Hydrocarbons (as Methane)			
Formula Weight of Methane	Fwt	16.04	
Concentration, ppm (wet)	ppmw	1.812	1.812
Concentration, ppm (dry)	ppmvd	2.21	2.21
Concentration, ppm@7%O ₂	ppm@7%O ₂	3.02	3.02
Concentration, mg/DSCM@7%O ₂	mg/DSCM@7%	2.02	2.02
Emission Rate, lb/hr	lb/hr	0.237	0.237
Emission Rate, lb/MMBtu (Fd)	lb/MMBtu	0.00181	0.00181

CONCENTRATION AND EMISSION RATE SUMMARY

Client Name	Covanta Energy Group, Inc.
Plant Name	Kent County Waste to Energy F
Sampling Location	Unit 2 Stack
Operator	14016
Project #	PJJ

USE IN AVERAGE OF RUN SET? 1 or 0 =>			1	
CEM Run Number			5	
Run Date			06/24/14	
Run Start Time	hh:mm		1310	SET AVERAGE
Run Stop Time	hh:mm		1410	

Unit 2 Stack			
Moisture Content	% H ₂ O	19.1	19.1
Dry Mole Fraction	Mfd	0.809	0.809
Oxygen Percentage	% O ₂	10.855	10.855
Oxygen Based F-Factor (Fd)	DSCF/MM	9570	9570
Dry Standard Stack Flow Rate	DSCFM	43,606	43,606
Air Flow and Moisture Taken From Test Run =>		2-S-M8-2	

Unit 2 Stack			
Total Hydrocarbons (as Methane)			
Formula Weight of Methane	Fwt	16.04	
Concentration, ppm (wet)	ppmvw	0.874	0.874
Concentration, ppm (dry)	ppmvd	1.08	1.08
Concentration, ppm@7%O ₂	ppm@7%O ₂	1.49	1.49
Concentration, mg/DSCM@7%O ₂	mg/DSCM@7%	0.997	0.997
Emission Rate, lb/hr	lb/hr	0.118	0.118
Emission Rate, lb/MMBtu (Fd)	lb/MMBtu	0.00090	0.00090

CONCENTRATION AND EMISSION RATE SUMMARY

Client Name	Covanta Energy Group, Inc.
Plant Name	Kent County Waste to Energy F
Sampling Location	Unit 2 Stack
Operator	14016
Project #	PJJ

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1	
CEM Run Number		11	
Run Date		06/24/14	
Run Start Time	hh:mm	1814	SET AVERAGE
Run Stop Time	hh:mm	1914	

Unit 2 Stack			
Moisture Content	% H ₂ O	18.8	18.8
Dry Mole Fraction	Mfd	0.812	0.812
Oxygen Percentage	% O ₂	10.547	10.547
Oxygen Based F-Factor (Fd)	DSCF/MM	9570	9570
Dry Standard Stack Flow Rate	DSCFM	42,532	42,532
Air Flow and Moisture Taken From Test Run =>		2-S-M2/4-1	

Unit 2 Stack			
Total Hydrocarbons (as Methane)			
Formula Weight of Methane	Fwt	16.04	
Concentration, ppm (wet)	ppm _w	0.787	0.787
Concentration, ppm (dry)	ppm _v	0.969	0.969
Concentration, ppm@7%O ₂	ppm@7%O ₂	1.30	1.30
Concentration, mg/DSCM@7%O ₂	mg/DSCM@7%	0.868	0.868
Emission Rate, lb/hr	lb/hr	0.103	0.103
Emission Rate, lb/MMBtu (Fd)	lb/MMBtu	0.00078	0.00078

**APPENDIX A.13
Test Results**

**Unit 2 Stack
Facility Sulfur Dioxide, Nitrogen Oxides, and Carbon Monoxide**

CONTINUOUS MONITORING RESULTS

Client Name	Covanta Energy Group, Inc.	Operator	Facility
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68
USE IN AVERAGE OF RUN SET? 1 or 0 =>			
CEM Run Number	1	2	3
			SET AVERAGE

Concentration and Emission Rate Data Summary

Sulfur Dioxide - 8 hour					
Run Date		06/23/14	06/23/14	06/23/14	
Run Start Time	hh:mm	0000	0800	1600	
Run Stop Time	hh:mm	0800	1600	2400	
Air Flow Results and other data taken from Run Number:					
	RUN ID	2-S-M29-1,2,3	2-S-M29-1,2,3	2-S-M29-1,2,3	
Dry Standard Stack Flow/Minute	DSCFM	41,438	41,438	41,438	41,438
Molecular Weight	MW	64.06	64.06	64.06	64.06
Concentration, ppmvd	ppmvd	4	3	6	4
Concentration @ 7% O ₂	ppm@7%	5	3	8	5
Emission Rate, lb/hr	lb/hr	1.65	1.24	2.48	1.79

CONTINUOUS MONITORING RESULTS

Client Name	Covanta Energy Group, Inc.	Operator	Facility
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1		SET AVERAGE
CEM Run Number	1	2	3		

Concentration and Emission Rate Data Summary

Nitrogen Oxides - 1 hour						
Run Date		06/23/14	06/23/14	06/23/14		
Run Start Time	hh:mm	0900	1000	1100		
Run Stop Time	hh:mm	1000	1100	1200		
Alr Flow Results and other data taken from Run Number:	RUN ID	2-S-M29-1	2-S-M29-1	2-S-M29-1		
Dry Standard Stack Flow/Minute	DSCFM	41,992	41,992	41,992		41,992
Molecular Weight	MW	46.01	46.01	46.01	46.01	46.01
Concentration, ppmvd	ppmvd	141	144	141		142
Concentration @ 7% O ₂	ppm@7%	190	189	188		189
Emission Rate, lb/hr	lb/hr	42.4	43.3	42.4		42.7

Nitrogen Oxides - 3 hour						
Run Date		06/23/14	06/23/14	06/23/14		
Run Start Time	hh:mm	0900	1200	1500		
Run Stop Time	hh:mm	1200	1500	1800		
Alr Flow Results and other data taken from Run Number:	RUN ID	2-S-M29-1	2-S-M29-2	2-S-M29-3		
Dry Standard Stack Flow/Minute	DSCFM	41,992	40,841	41,481		41,438
Molecular Weight	MW	46.01	46.01	46.01	46.01	46.01
Concentration, ppmvd	ppmvd	142	148	143		144
Concentration @ 7% O ₂	ppm@7%	189	190	190		190
Emission Rate, lb/hr	lb/hr	42.7	43.3	42.5		42.8

CONTINUOUS MONITORING RESULTS

Client Name	Covanta Energy Group, Inc.	Operator	Facility
Plant Name	Kent County Waste to Energy Facility	Project #	14016
Sampling Location	Unit 2 Stack	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>	1	1	1			
CEM Run Number	1	2	3			SET AVERAGE

Concentration and Emission Rate Data Summary

Carbon Monoxide - 1 hour						
Run Date		06/23/14	06/23/14	06/23/14		
Run Start Time	hh:mm	0900	1000	1100		
Run Stop Time	hh:mm	1000	1100	1200		
Air Flow Results and other data taken from Run Number:	RUN ID	2-S-M29-1	2-S-M29-1	2-S-M29-1		
Dry Standard Stack Flow/Minute	DSCFM	41,992	41,992	41,992		41,992
Molecular Weight	MW	28.01	28.01	28.01	28.01	28.01
Concentration, ppmvd	ppmvd	37	15	50		34
Concentration @ 7% O ₂	ppm@7%	50	20	67		46
Emission Rate, lb/hr	lb/hr	6.78	2.75	9.16		6.23

Carbon Monoxide - 8 hour						
Run Date		06/23/14	06/23/14	06/23/14		
Run Start Time	hh:mm	0000	0800	1600		
Run Stop Time	hh:mm	0800	1600	2400		
Air Flow Results and other data taken from Run Number:	RUN ID	2-S-M29-1,2,3	2-S-M29-1,2,3	2-S-M29-1,2,3		
Dry Standard Stack Flow/Minute	DSCFM	41,438	41,438	41,438		41,438
Molecular Weight	MW	28.01	28.01	28.01	28.01	28.01
Concentration, ppmvd	ppmvd	6	29	13		16
Concentration @ 7% O ₂	ppm@7%	9	38	18		22
Emission Rate, lb/hr	lb/hr	1.08	5.24	2.35		2.89