Report of...

Compliance Emission Sampling

Performed for the...

City of Wyandotte

Municipal Services Wyandotte, Michigan



on

Units #7 & #8

November 5-26, 2014

256.12

Network Environmental, Inc. Grand Rapids, MI

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I. INTRODUCTION

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Network Environmental, Inc. was retained by the City of Wyandotte, Department of Municipal Services, to perform an emission study on their Units #7 and #8. The purpose of the study was to document compliance with MDEQ Air Quality Division ROP No. MI-ROP-B2132-2010, MI-ROP-B2132-2010 has established the following emission limits for these sources:

Unit	Pollutant	Emission (Limit
EUUNIT7BLR	Particulate Matter (PM)	0.10 Lbs/MMBTU, 0.078 Lbs/1000 Lbs @50% EA & 44 Lbs/Hr
	Particulate Matter (PM)	0.025 Lbs/MMBTU & 9.23 Lbs/Hr
	PM ₁₀	0.025 Lbs/MMBTU & 9.23 Lbs/Hr
EUUNIT8BLR	voc	8.86 Lbs/Hr
Cellyres have solden at the sold	Lead (Pb)	0,005 Lbs/Hr

The following reference test methods were employed to conduct the sampling:

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- Particulate (PM & PM₁₀) U.S. EPA Methods 17 & 202
- VOC U.S. EPA Method 25A
- Lead (Pb) U.S. EPA Method 29
- Exhaust Gas Parameters (air flow rate, temperature, moisture & density) U.S. EPA Methods 1-4

The sampling was performed by Stephan K. Byrd, R. Scott Cargill and Richard D. Eerdmans of Network Environmental, Inc.. Unit 7 was sampled on November 5, 2014. Unit 8 was sampled over the period of November 24-26, 2014. Assisting with the sampling were Mr. Chris Brohl and Ms. Kimberly Kemper of Wyandotte Municipal Services, Mr. Nick Hansen of Barr Engineering and the operating staff of the facility. Mr. Mark Dziadosz of the Michigan Department of Environmental Quality (MDEQ) - Air Quality Division was present to observe portions of the sampling and source operation for Unit 7. Mr. Tom Maza and Mr. Stephen Weis of the Michigan Department of Environmental Quality (MDEQ) - Air Quality Division were present to observe portions of the sampling and source operation for Unit 7. Mr. Tom Maza and Mr.

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II. PRESENTATION OF RESULTS

II.1 TABLE 1 PARTICULATE (TOTAL FILTERABLE) **EMISSION RESULTS SUMMARY** UNIT #7 EXHAUST **CITY OF WYANDOTTE** WYANDOTTE, MICHIGAN

.Sample [Air Flow Rate DSCFM ⁽¹⁾	Concentration	Mass Emission Rate	
	Date	Time		Lbs/1000 Lbs, Dry @ 50% EA ⁽²⁾	Ĺbs/Hr ⁽³⁾	Lbs/MMBTU Heat Input ⁽⁴⁾
1	11/5/14	09:20-10:37	97,239	0.0020	0.97	0,0021
2	11/5/14	11:02-12:19	92,714	0.0014	0.65	0.0015
3	11/5/14	12:36-13:50	93,822	0.0015	0.70	0.0016
	Average		94,592	0.0016	0.78	0.0017

 DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29,92 in. Hg)
 Lbs/1000 Lbs, Dry @ 50 % EA = Pounds of Particulate Per Thousand Pounds of Exhaust Gas On A Dry Basis Corrected to Fifty Percent Excess Air

(3) Lbs/Hr = Pounds of Particulate Per Hour

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(4) Lbs/MMBTU Heat Input = Pounds Per Million BTU of Heat Input (Calculated Using Equation 19.6 From U.S. EPA Method 19 With An F-Factor of 1,040 DSCF/MMBTU)

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II.2 TABLE 2 PARTICULATE (TOTAL FILTERABLE) EMISSION RESULTS SUMMARY UNIT #8 EXHAUST CITY OF WYANDOTTE WYANDOTTE, MICHIGAN

Sample	Dațe	Time	Air Flow Rate DSCFM ⁽¹⁾	Mass Er Lbs/Hr. ⁽²⁾	nission Rate Lbs/MMBTU Heat Input ⁽⁹⁾
1	11/24/14	15:52-17:59	58,021	2,69	0.0089
2	11/25/14	08:53-10:59	60,685	2.71	0.0098
3	11/25/14	11:41-13:52	57,987	3.37	0.0112
	Averag	e	58,898	2.92	0.0100

(1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in, Hg)

(2) Lbs/Hr = Pounds of Particulate Per Hour

(3) Lbs/MMBTU Heat Input = Pounds Per Million BTU of Heat Input (Calculated Using Equation 19-6 From U.S. EPA Method 19 With An F-Factor of 1,800 DSCF/MMBTU)

II.3 TABLE 3 PARTICULATE (TOTAL FILTERABLE & CONDENSABLE) EMISSION RESULTS SUMMARY UNIT #8 EXHAUST CITY OF WYANDOTTE WYANDOTTE, MICHIGAN						
			Air Flow Rate	Mass Emission Rate		
Sample	Date	Lime	DSCFM (1)	Lbs/Hr ⁽²⁾	Lbs/MMBTU Heat Input ⁽³⁾	
1	11/24/14	15:52-17:59	58,021	2.99	0.0099	
2	11/25/14	08:53-10:59	60,685	4.05	0.0146	
3	11/25/14	11:41-13:52	57,987	4.28	0.0143	
	Average	9	58,898	3.77	0.0129	

(1) DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in, Hg)

(2) Lbs/Hr = Pounds of Particulate Per Hour

(3) Lbs/MMBTU Heat Input = Pounds Per Million BTU of Heat Input (Calculated Using Equation 19-6 From U.S. EPA Method 19 With An F-Factor of 1,800 DSCF/MMBTU)

II.4 TABLE 4 **TOTAL HYDROCARBON (VOC) EMISSION RESULTS SUMMARY UNIT #8 EXHAUST CITY OF WYANDOTTE** WYANDOTTE, MICHIGAN

Sample Date Time		Air Flow Rate SCFM (1)	Concentration	Mass Emission Rate	
	lime		PPM ⁽²⁾	Lbs/Hr ⁽³⁾	
1	11/25/14	09:00-10:00		1.5	0.66
2	11/25/14	10:13-11:13	64,178	0.4	0.18
3	11/25/14	11:24-12:24		1.5	0,66
		Average		1.1	0,50

SCFM = Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg). Shown is the average air flow rate measured during the particulate testing (conducted simultaneous with VOC testing) on 11/25/14.
 PPM = Parts Per Million (v/v) On An Actual (Wet) Basis As Propane
 Lbs/Hr = Pounds of VOC Per Hour As Propane

II.5 TABLE 5 LEAD (Pb) EMISSION RESULTS SUMMARY UNIT #8 EXHAUST CITY OF WYANDOTTE WYANDOTTE, MICHIGAN

Sample Date		Air Flow Rate	Concentration	Mass Emission' Rate	
	Jime	DSCFM (1):	Mg/M ³ ⁽²⁾	Lbs/Hr ⁽³⁾	
1	11/25/14	15:27-17:34	57,946	0.0042	0.00091
2	11/26/14	09:10-11:17	60,316	0.0034	0.00077
3	11/26/14	11:43-13:49	57,794	0,0031	0.00067
	Average		58,685	0.0036	0.00078

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DSCFM = Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg).
 Mg/M³ = Milligrams of Pb Per Dry Standard Cubic Meter
 Lbs/Hr = Pounds of Pb Per Hour

III, DISCUSSION OF RESULTS

The results of the emission sampling are summarized in Tables 1 through 4 (Sections II.1 through II.4), The results are presented as follows:

III.1 Unit #7 Particulate (Total Filterable)

Table 1 summarizes the Unit #7 particulate (total filterable) emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in, Hg)
- Particulate Concentration (Lbs/1000 Lbs, Dry @ 50% EA) Pounds of Particulate Per Thousand
- Pounds of Exhaust Gas On A Dry Basis Corrected to Fifty Percent Excess Air
- Particulate Mass Emission Rate (Lbs/Hr) Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/MMBTU Heat Input) Pounds of Particulate Per Million BTU
 - of Heat Input (Calculated using Equation 19-6 from U.S. EPA Method 19. The F Factor used for the Lbs/MMBTU calculations was 1,040 DSCF/MMBTU.)

The Unit #7 particulate results include only the filterable fraction. A more detailed breakdown of each individual particulate sample can be found in Appendix A.

III.2 Unit #8 Particulate (Total Filterable)

Table 2 summarizes the Unit #8 particulate (total filterable) emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Particulate Mass Emission Rate (Lbs/Hr) Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/MMBTU Heat Input) Pounds of Particulate Per Million BTU of Heat Input (Calculated using Equation 19-6 from U.S. EPA Method 19. The F Factor used for the Lbs/MMBTU calculations was 1,800 DSCF/MMBTU.)

The Unit #8 particulate results include both the filterable fraction and the condensable (back half) particulate fraction. The individual results for each fraction and a more detailed breakdown of each individual particulate sample can be found in Appendix A.

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III.3 Unit #8 Particulate (Total Filterable & Condensable)

Table 3 summarizes the Unit #8 particulate (total filterable & condensable) emission results as follows:

Sample

- Date
 - Time
 - Air Flow Rate (DSCFM) Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29,92 in, Hg)
- Particulate Mass Emission Rate (Lbs/Hr) Pounds of Particulate Per Hour
- Particulate Mass Emission Rate (Lbs/MMBTU Heat Input) Pounds of Particulate Per Million BTU of Heat Input (Calculated using Equation 19-6 from U.S. EPA Method 19. The F Factor used for the Lbs/MMBTU calculations was 1,800 DSCF/MMBTU.)

The Unit #8 particulate results include both the filterable fraction and the condensable (back half) particulate fraction. The individual results for each fraction and a more detailed breakdown of each individual particulate sample can be found in Appendix A.

III.4 Unit #8 Total Hydrocarbons (VOC)

Table 4 summarizes the Unit 8 VOC emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (SCFM) Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- VOC Concentration (PPM) Parts Per Million (v/v) on an Actual (Wet) Basis As Propane
- VOC Mass Emission Rate (Lbs/Hr) Pounds of VOC Per Hour As Propane

All the VOC sample data was calibration corrected using Equation 7E-5b from U.S. EPA Method 7E.

III.5 Unit #8 Lead (Pb)

Table 5 summarizes the Unit 8 Pb emission results as follows:

- Sample
- Date
- Time
- Air Flow Rate (DSCFM) Dry Standard Cubic Feet Per Minute (STP = 68 °F & 29.92 in. Hg)
- Pb Concentration (Mg/M³) Milligrams of Pb Per Dry Standard Cubic Meter
- Pb Mass Emission Rate (Lbs/Hr) Pounds of Pb Per Hour

IV. SAMPLING AND ANALYTICAL PROTOCOL

IV.1 Unit #7 & #8 Total Filterable Particulate – The Unit #7 and Unit 8 particulate emission sampling was conducted in accordance with U.S. EPA Method 17. Method 17 is an in-stack filtration method. Three (3) samples were collected from the Unit 7 exhaust. Each sample was sixty four (64) minutes in duration and had a minimum sample volume of thirty (30) dry standard cubic feet. The samples were collected isokinetically and analyzed for Particulate by gravimetric analysis. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis. A diagram of the Method 17 particulate sampling train is shown in Figure 1.

IV.2 Unit #8 PM₁₀ (Filterable & Condensable) Particulate – The Unit #8 PM₁₀ emission sampling was conducted in accordance with U.S. EPA Method 17 and 202. Method 17 is an in-stack filtration method. Three (3) samples were collected from the exhaust. Each sample was one hundred twenty (120) minutes in duration and had a minimum sample volume of sixty (60) dry standard cubic feet. The samples were collected isokinetically and analyzed for Filterable Particulate by gravimetric analysis.

In addition to the front half analysis, the back half condensable particulate matter was determined in accordance with U.S. EPA Method 202 (Dry Impinger Technique). A sixty (60) minute nitrogen purge (as specified in Method 202) was conducted for the back half condensables immediately following each sample. The back half samples were extracted and analyzed for condensable particulate in accordance with Method 202. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis. The Unit #8 particulate sampling train is shown in Figure 2,

IV.3 Unit #8 Total Hydrocarbons (VOC) – The Unit #8 VOC sampling was conducted in accordance with U.S. EPA Method 25A. A J.U.M. Model 3-500 flame ionization detector (FID) analyzer was used to monitor the exhaust. Sample gas was extracted through a heated probe. A heated Teflon sample line was used to transport the exhaust gases to the analyzer. This analyzer produces instantaneous readouts of the total hydrocarbon concentrations (PPM).

The analyzer was calibrated by system injection (from the back of the stack probe to the analyzer) prior to the testing using propane calibration gases. A span gas of 85.78 PPM was used to establish the initial instrument calibration. Calibration gases of 30.37 PPM and 50.19 PPM propane were used to determine the calibration error of the analyzer. After each sample, a system zero and system injection of 30.37 PPM

propane were performed to establish system drift and system bias during the test period. All calibration gases used were EPA Protocol Calibration Gases. Three (3) samples were collected from the Unit #8 exhaust. Each sample was sixty (60) minutes in duration.

The analyzer was calibrated to the output of the data acquisition system (DAS) used to collect the data from the exhaust. The analyzer averages were corrected for calibration error and drift using formula EQ.7E-5b from 40 CFR Part 60, Appendix A, Method 7E. Figure 3 is a diagram of the VOC sampling train.

IV.4 Unit #8 Lead (Pb) — The Unit #8 Pb emission sampling was determined by employing U.S. EPA Method 29 (multiple metals train). Three (3) samples were collected from the exhaust. The samples were one hundred twenty (120) minutes in duration. Each sample had a minimum sample volume of sixty (60) dry standard cubic feet.. The samples were collected isokinetically on quartz filters, in a nitric acid/hydrogen peroxide solution.

The front half and the nitric acid/hydrogen peroxide solutions were analyzed for Pb by inductively coupled argon plasma mass spec (ICAP/MS) analysis. All the quality assurance and quality control procedures listed in the method were incorporated in the sampling and analysis.

A diagram of the Pb sampling train is shown in Figure 4.

IV.5 Exhaust Gas Parameters – The exhaust gas parameters (air flow rate, temperature, moisture and density) were determined in conjunction with the other sampling by employing U.S. EPA Methods 1 through 4. Air flow rates, temperatures and moistures were determined using the isokinetic sampling trains. All the quality assurance and quality control procedures listed in the methods were incorporated in the sampling and analysis.

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This report was prepared by:

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