

**COMPLIANCE TEST REPORT**  
Compression Ignition Diesel Fuel-Fired Engine Generators  
Units EU-WMSENGINE1, EU-WMSENGINE2, EU-WMSENGINE3

Prepared for:



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Wyandotte Municipal Services  
Wyandotte, MI

32132

Prepared by:



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PN: 050616.0003

November 2013





**PREFACE**

I, Karl Mast, do hereby certify that the source emissions testing conducted at Wyandotte Municipal Services in Wyandotte, Michigan was performed in accordance with the procedures set forth by the United States Environmental Protection Agency, and that the data and results submitted within this report are an exact representation of the testing.

A handwritten signature in cursive script that reads "Karl Mast".

Karl Mast  
Test Supervisor

I, Karl Mast, do hereby attest that all work on this project was performed under my direct supervision, and that this report accurately and authentically presents the source emissions testing conducted at Wyandotte Municipal Services in Wyandotte, Michigan.

A handwritten signature in cursive script that reads "Karl Mast".

Karl Mast  
Test Supervisor

**SUMMARY**

The compliance emissions testing was conducted on three (3) Wyandotte Municipal Services' Diesel Engines identified as EU-WMSENGINE1, EU-WMSENGINE2 and EU-WMSENGINE3. The testing was conducted during the period October 23-24, 2013. The primary purpose of this testing program was to determine carbon monoxide control efficiencies for each diesel engine and to obtain compliance level Nitrogen Oxides emissions data as required by the Michigan Department of Environmental Quality air permit for this plant. The results of the testing are detailed in the following table.

<b>Diesel Engine Emissions Results</b>			
<b>Emission Factor</b>	<b>EU-WMSENGINE1</b>	<b>EU-WMSENGINE2</b>	<b>EU-WMSENGINE3</b>
CO Control (%)	70.83	71.30	74.43
NO <sub>x</sub> Emissions (Lbs/Hr)	N.A.	N.A.	30.60

Only one of three engines was tested for NO<sub>x</sub> emissions as per the permit for the plant which does not require testing of all three engines for NO<sub>x</sub> emissions.



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## 1. INTRODUCTION

This report presents the results of the source emissions compliance testing conducted by Environmental Quality Management, Inc. (EQ) for Wyandotte Municipal Services (Wyandotte Municipal Services) in Wyandotte, Michigan. The primary purpose of this testing program was to determine, through instrumental analyzer procedures (IAP), carbon monoxide (CO) concentrations in the inlet and outlet gas streams from the catalytic oxidizers installed on each diesel engine in order to determine formaldehyde emissions rates which are to be determined by the CO control efficiency of the catalytic oxidizers and to determine nitrogen oxides (NO<sub>x</sub>) emissions discharged into the atmosphere from the diesel generators. The results are to be compared against the limitations established by the Michigan Department of Environmental Quality (Michigan DEQ) Permit to Install No. 90-05, and the U.S. Environmental Protection Agency (USEPA) National Emissions Standards for Hazardous Air Pollutants, 40 CFR 63, Subparts A and ZZZZ.

EQ's responsibility was to conduct instrument monitoring for NO<sub>x</sub>, O<sub>2</sub> and CO emissions and perform data reduction for emissions concentrations. Wyandotte Municipal Services' responsibility was to maintain process operating parameters, provide process operating data exhaust temperatures and fuel consumption rates per compliance test requirements.

The following report provides information pertaining to Wyandotte Municipal Services' process operations, emissions testing and analytical results. The Compliance testing conducted on Units EU-WMSENGINE1 (Unit 1) and EU-WMSENGINE2 (Unit 2) on were performed October 23, 2013, from 8:30 A.M. to 4:04 P.M. and EU-WMSENGINE3 (Unit 3) was performed on October 24, 2013, from 7:50 A.M. to 11:14 A.M.

The following requirements were specific for the testing program:

1. Equipment calibrations performed and calibration data provided.
2. Three (3), consecutive one (1)-hour, minimum, CO emissions test runs performed at the inlet and outlet (exhaust stack) of each Diesel Generator's catalytic oxidizer pursuant to USEPA, Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, and Michigan DEQ Rules, variously as noted at R336.1331, R336.1910, R336.2001, R336.2003, R336.2004.
3. Three (3), consecutive one (1)-hour, minimum, NO<sub>x</sub> emissions test runs performed at the outlet (exhaust stack) of at least one Diesel Generator's catalytic oxidizer pursuant to USEPA, Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, and Michigan DEQ Rules, variously as noted at R336.1331, R336.1910, R336.2001, R336.2003, R336.2004.
4. Three (3), consecutive one (1)-hour, minimum, O<sub>2</sub> emissions test runs performed at the outlet (exhaust stack) of each Diesel Generator's catalytic oxidizer pursuant



to USEPA, Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, and Michigan DEQ Rules, variously as noted at R336.1331, R336.1910, R336.2001, R336.2003, R336.2004.

5. Process manufacturing capacities and control devices maintained at required operating conditions, production rates recorded during the emissions testing.
6. All testing and analysis performed in accordance with current USEPA test methodologies and analytical procedures for NO<sub>x</sub> and CO emissions determinations.
7. Formaldehyde emissions are to be determined as CO emissions and shall be controlled by 70 percent in order to comply with a formaldehyde emissions limit of 580 parts per billion.
8. NO<sub>x</sub> emissions are to be limited to no more than 34.1 lbs per hour.

The emissions testing program was supervised by EQ whose headquarters is in Cincinnati, Ohio. EQ also performed the NO<sub>x</sub>, O<sub>2</sub> and CO emission testing, data review, and prepared the final report.

The emissions testing was performed in accordance with EPA Reference Methods 7E (NO<sub>x</sub>), 10 (CO), and 19 (Emissions Calculations) Title 40, Part 60, Appendix A of the U.S. Code of Federal Regulations.

The testing program was approved by and/or coordinated with Gary Ambrus, CHMM, Environmental Coordinator, Wyandotte Municipal Services and Chris Brohl, Power Assistant Superintendent, Wyandotte Municipal Services. The emission testing was performed by Karl Mast, Manager, Air Emission, EQ, and Tom Gerstle, P.E., Manager, Air Compliance, EQ. The emission testing was observed by Mark Dziadosz, MDEQ, Air Quality Division.



**2. TEST RESULTS SUMMARY**

The source emission testing was performed utilizing USEPA Methods 3A, 7E and 10 at the inlet and outlet of each diesel generator catalytic oxidizers sampling location. NOx emissions were determined for one diesel generator only. A summary of the test results is given below:

<b>CO Emission Control Testing Results</b>			
<b>Run No.</b>	<b>EU-WMSENGINE1 Emissions Control (%)</b>	<b>EU-WMSENGINE2 Emissions Control (%)</b>	<b>EU-WMSENGINE3 Emissions Control (%)</b>
1	68.21	73.47	75.07
2	70.77	71.12	73.71
3	73.50	69.32	74.53
Average	70.83	71.30	74.43
Emissions Limits	70	70	70

<b>NOx Emission Testing Results</b>	
<b>Run No.</b>	<b>EU-WMSENGINE3 Emissions (Lbs/Hr)</b>
1	30.05
2	32.20
3	29.54
Average	30.60
Emissions Limits	34.1

Please note the NOx emissions testing was not required to be conducted on all three diesel generators in accordance with the requirements of PTI 90-05. A complete list of test parameters for each Method 7E and 10 emissions test runs performed at the inlet and outlet sampling location can be found in Tables 1 through 4.

Sample calculations and examples of the equations used to generate the test results can be found in Appendix D.



**Table 1. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 1-Outlet**

<b>EQM, Inc. .... ENVIRONMENTAL TESTING CONSULTANTS</b>			
1280 Arrowhead Ct. Ste.2, Crown Point, IN 46307 TEL (219) 661-9900 / FAX (219) 661-9902			
<b>TABLE 1</b>			
<b>EPA METHOD 10 / 19</b>			
<b>CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS</b>			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 1 - OUTLET		DATA INPUT BY: acf	
<b>INPUT DATA</b>			
Run Number	1	2	3
Date	23-Oct-13	23-Oct-13	23-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0830-0929	0945-1044	1105-1204
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	112.6	113.2	114.0
Heat Input (mmBtu/Hr)	15.63	15.71	15.82
Average O2 Concentration (%)	12.2	11.9	11.8
Average Cal. Bias Corrected CO Concentration (PPMV)	15.56	14.22	14.08
<b>CALCULATED DATA</b>			
CO Emissions Concentration (Lb/DSCF)	1.13E-06	1.03E-06	1.02E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.025	0.022	0.022
CO Emissions Rate (Lb/Hr)	0.39	0.35	0.34
CO Control Efficiency (%)	68.21%	70.77%	73.50%
Average CO Emissions Concentration (Lb/DSCF)	1.06E-06		
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.023		
Average CO Emission Rate (Lb/Hr)	0.36		
Average CO Control Efficiency (%)	70.83%		
Signature of Reviewer:			



**Table 1A. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 1-Inlet**

<b>EQM, Inc. .... ENVIRONMENTAL TESTING CONSULTANTS</b>			
1280 Arrowhead Ct. Ste.2, Crown Point, IN 46307 TEL (219) 661-9900 / FAX (219) 661-9902			
<b>TABLE 1A EPA METHOD 10 / 19 CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS</b>			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 1 - INLET		DATA INPUT BY: acf	
<b>INPUT DATA</b>			
Run Number	1	2	3
Date	23-Oct-13	23-Oct-13	23-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0830-0929	0945-1044	1105-1204
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	112.6	113.2	114.0
Heat Input (mmBtu/Hr)	15.63	15.71	15.82
Average O2 Concentration (%)	11.4	11.1	11.2
Average Cal. Bias Corrected CO Concentration (PPMV)	48.95	48.65	53.14
<b>CALCULATED DATA</b>			
CO Emissions Concentration (Lb/DSCF)	3.56E-06	3.54E-06	3.86E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.072	0.070	0.076
CO Emissions Rate (Lb/Hr)	1.13	1.09	1.21
Average CO Emissions Concentration (Lb/DSCF)		3.65E-06	
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)		0.073	
Average CO Emission Rate (Lb/Hr)		1.14	
Signature of Reviewer:			



**Table 2. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 2-Outlet**

TABLE 2 EPA METHOD 10 / 19 CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 2 - OUTLET		DATA INPUT BY: acf	
INPUT DATA			
Run Number	4	5	6
Date	23-Oct-13	23-Oct-13	23-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	1245-1344	1350-1449	1505-1604
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	112.6	113.2	113.0
Heat Input (mmBtu/Hr)	15.63	15.71	15.68
Average O2 Concentration (%)	11.4	11.3	11.7
Average Cal. Bias Corrected CO Concentration (PPMV)	13.75	13.77	14.56
CALCULATED DATA			
CO Emissions Concentration (Lb/DSCF)	1.00E-06	1.00E-06	1.06E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.020	0.020	0.022
CO Emissions Rate (Lb/Hr)	0.32	0.31	0.35
CO Control Efficiency (%)	73.47%	71.12%	69.32%
Average CO Emissions Concentration (Lb/DSCF)		1.02E-06	
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)		0.021	
Average CO Emission Rate (Lb/Hr)		0.33	
Average CO Control Efficiency (%)		71.30%	
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**Table 2A. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 2-Inlet**

<b>EQM, Inc. .... ENVIRONMENTAL TESTING CONSULTANTS</b>			
1280 Arrowhead Ct. Ste.2, Crown Point, IN 46307 TEL (219) 661-9900 / FAX (219) 661-9902			
<b>TABLE 2A</b>			
<b>EPA METHOD 10 / 19</b>			
<b>CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS</b>			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 2 - INLET		DATA INPUT BY: acf	
<b>INPUT DATA</b>			
Run Number	4	5	6
Date	23-Oct-13	23-Oct-13	23-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	1245-1344	1350-1449	1505-1604
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	112.6	113.2	113.0
Heat Input (mmBtu/Hr)	15.63	15.71	15.68
Average O2 Concentration (%)	11.9	11.1	11.1
Average Cal. Bias Corrected CO Concentration (PPMV)	51.82	47.68	47.46
<b>CALCULATED DATA</b>			
CO Emissions Concentration (Lb/DSCF)	3.77E-06	3.47E-06	3.45E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.080	0.068	0.068
CO Emissions Rate (Lb/Hr)	1.25	1.07	1.06
Average CO Emissions Concentration (Lb/DSCF)		3.56E-06	
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)		0.072	
Average CO Emission Rate (Lb/Hr)		1.13	
Signature of Reviewer:			



**Table 3. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 3-Outlet**

TABLE 3 EPA METHOD 10 / 19 CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 3 - OUTLET		DATA INPUT BY: acf	
INPUT DATA			
Run Number	1	2	3
Date	24-Oct-31	24-Oct-31	24-Oct-31
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0750-0849	0945-1044	1015-1114
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	113.80	115.40	114.80
Heat Input (mmBtu/Hr)	15.80	16.02	15.93
Average O2 Concentration (%)	11.3	11.3	11.4
Average Cal. Bias Corrected CO Concentration (PPMV)	12.88	13.78	14.38
CALCULATED DATA			
CO Emissions Concentration (Lb/DSCF)	9.36E-07	1.00E-06	1.05E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.019	0.020	0.021
CO Emissions Rate (Lb/Hr)	0.30	0.32	0.34
CO Control Efficiency (%)	75.07%	73.71%	74.53%
Average CO Emissions Concentration (Lb/DSCF)	9.95E-07		
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.020		
Average CO Emission Rate (Lb/Hr)	0.32		
Average CO Control Efficiency (%)	74.43%		
Signature of Reviewer:			



**Table 3A. EPA Method 10-Carbon Monoxide Emissions -Test Results-Unit 3-Inlet**

<b>EQM, Inc. .... ENVIRONMENTAL TESTING CONSULTANTS</b>			
1280 Arrowhead Ct. Ste.2, Crown Point, IN 46307 TEL (219) 661-9900 / FAX (219) 661-9902			
<b>TABLE 3A</b>			
<b>EPA METHOD 10 / 19</b>			
<b>CARBON MONOXIDE (CO) EMISSIONS TEST RESULTS</b>			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 3 - INLET		DATA INPUT BY: acf	
<b>INPUT DATA</b>			
Run Number	1	2	3
Date	24-Oct-13	24-Oct-13	24-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0750-0849	0945-1044	1015-1114
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	113.80	115.40	114.80
Heat Input (mmBtu/Hr)	15.80	16.02	15.93
Average O2 Concentration (%)	11.1	11.0	11.1
Average Cal. Bias Corrected CO Concentration (PPMV)	51.66	52.41	56.45
<b>CALCULATED DATA</b>			
CO Emissions Concentration (Lb/DSCF)	3.76E-06	3.81E-06	4.10E-06
CO Emissions Rate Per "F" Factor (Lb/mmBtu)	0.074	0.074	0.081
CO Emissions Rate (Lb/Hr)	1.16	1.18	1.28
Average CO Emissions Concentration (Lb/DSCF)		3.89E-06	
Average CO Emissions Rate Per "F" Factor (Lb/mmBtu)		0.076	
Average CO Emission Rate (Lb/Hr)		1.21	
Signature of Reviewer: 			



**Table 4. EPA Method 7E-Nitrogen Oxides Emissions Test Results-Unit 1**

<b>EQM, Inc. .... ENVIRONMENTAL TESTING CONSULTANTS</b>			
1280 Arrowhead Ct. Ste.2, Crown Point, IN 46307 TEL (219) 661-9900 / FAX (219) 661-9902			
<b>TABLE 4 EPA METHOD 7E NITROGEN OXIDES (NOx) EMISSIONS TEST RESULTS</b>			
CLIENT: WYANDOTTE MUNICIPAL SERVICES		PROJECT NO.: 050616.0003	
SOURCE TESTED: UNIT 3		DATA INPUT BY: acf	
<b>INPUT DATA</b>			
Run Number	7	8	9
Date	24-Oct-13	24-Oct-13	24-Oct-13
Sampling Location	Exhaust Stack	Exhaust Stack	Exhaust Stack
Test Time, Start-Stop (24 Hour)	0750-0849	9:00-9:59	1015-1114
Sampling Time (Minutes)	60	60	60
Representative Oil Fuel (F) Factor (DSCF/mmBtu)	9190	9190	9190
Representative Oil Heat Content Factor (Btu/Gal)	138,800	138,800	138,800
Fuel Usage (Gal/Hr)	113.80	115.40	114.80
Heat Input (mmBtu/Hr)	15.80	16.02	15.93
Average O2 Concentration (%)	11.4	11.2	11.4
Average Cal. Bias Corrected NOx Concentration as NO2 (PPMV)	787.74	848.17	765.94
<b>CALCULATED DATA</b>			
NOx Emissions Concentration (Lb/DSCF)	9.41E-05	1.01E-04	9.15E-05
NOx Emissions Rate Per "F" Factor (Lb/mmBtu)	1.903	2.010	1.854
NOx Emissions Rate (Lb/Hr)	30.05	32.20	29.54
Average NOx Emissions Concentration (Lb/DSCF)	9.56E-05		
Average NOx Emissions Rate Per "F" Factor (Lb/mmBtu)	1.922		
Average NOx Emission Rate (Lb/Hr)	30.60		
Signature of Reviewer:			



### 3. FACILITY AND PROCESS DESCRIPTION

Wyandotte Municipal Services provides electrical power services to the Wyandotte, Michigan area. In that regard, Wyandotte Municipal Services operates three 2,000 KW standby compression ignition diesel fuel-fired engine generators, identified as EU-WMSENGINE1, EU-WMSENGINE2 and EU-WMSENGINE3, respectively, which emit through Stacks SV-SENGINE1, SV-SENGINE2 and SV-SENGINE3, respectively. Each generator is equipped with a catalytic oxidizer system to control formaldehyde emissions. For the purposes of the testing program, Carbon Monoxide (CO) has been identified as a surrogate for formaldehyde emissions and was the analyte measured to determine catalytic oxidizer performance. The plant has one flexible group which contains the three engines identified above.

The following table provide a summary of the production data for the emissions testing on October 23-24, 2013.

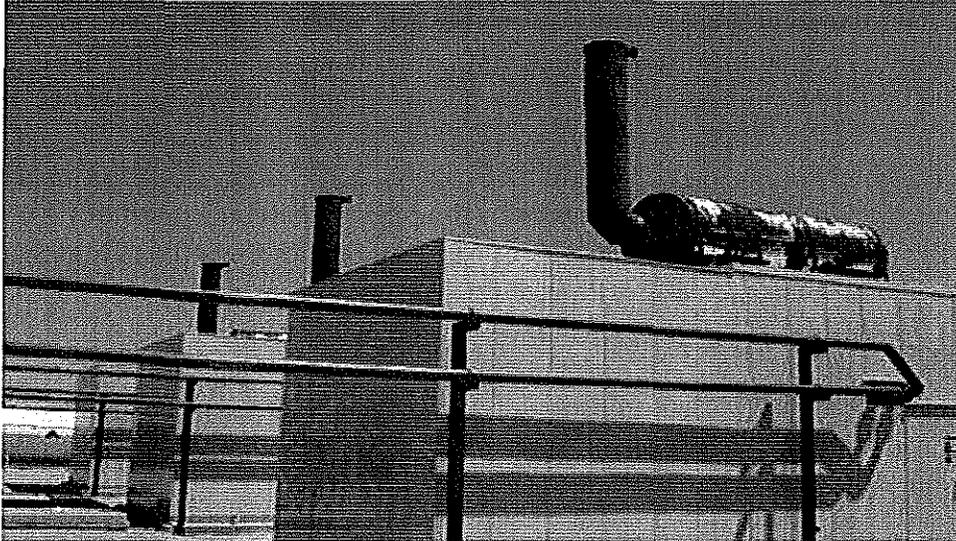
**Table 5. Wyandotte Diesel Generators Electric Production Data**

Diesel Generator Electric Production Data (KWH)		
Unit 1	Unit 2	Unit 3
1800	1800	1800

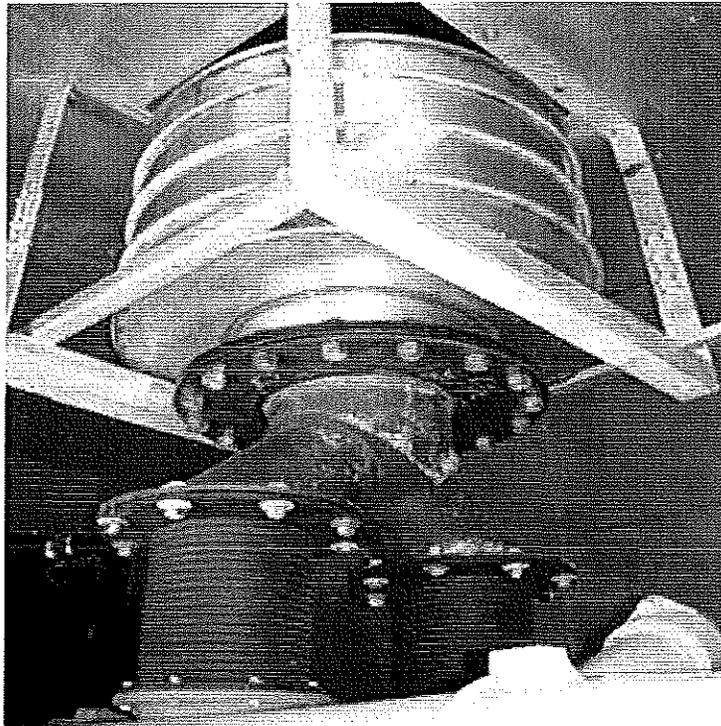
Process operating data and miscellaneous process information recorded during the emissions testing can be found in Appendix B of this report.



**Figure 1. Diesel Generators-Exhaust Stack Configurations**



**Figure 2. Diesel Generators-Typical Catalytic Oxidizer Inlet Sampling**



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#### 4. TEST PROCEDURES

EQ and EQ's affiliates and subcontractors use current U.S. EPA accepted testing methodologies in their Air Quality Programs as listed in the U.S. Code of Federal Regulations, Title 40, Part 60, Appendix A. For this testing program, the following specific methodologies were utilized:

- U.S. EPA Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- U.S. EPA Method 7E – Determination of Nitrogen Oxides Emissions From Stationary Sources (Instrumental Analyzer Procedure)
- U.S. EPA Method 10 – Determination of Carbon Monoxide Emissions From Stationary Sources
- U.S. EPA Method 19 - Determination of Sulfur Dioxide Removal Efficiency, and Particulate Matter, Sulfur Dioxide and Nitrogen Oxide Emission Rates, also to determine Representative Fuel Factor.

U.S. EPA Method 3A, 7E and 10 were performed at the sampling location during the emission testing using a Horiba Model PG 250 combination monitor. Please note that at the acceptance of Mr. Tom Maza, MDEQ, that the inlet O<sub>2</sub> and CO concentrations were determined through instrumental analysis of the contents of an integrated bag sample.

Calibration data, including on-site dry gas meter calibration audits, and pretest run and post-test run CEM calibrations of the aforementioned instrumentation, and calibration span gas certifications can be found in Appendix A.

A cyclonic flow check was omitted at the outlet emissions sampling locations due to the acceptable stack and test port configurations based on Method 1 requirements, and relatively laminar flows noted during the preliminary traverse procedures conducted prior to the emissions testing. The inlet sampling locations did not meet Method 1 requirements and thus representative flow samples could not be obtained. Accordingly, the inlet sampling locations' flow rates were assumed to be the equal to the flow rates of each engines' outlet sampling locations on a dry basis.

With the exception of the item noted above, no testing or sample recovery procedure deviations occurred during the onsite sampling phase of the testing program.

Calibration gas certifications used in performing the testing are included in Appendix C.



No significant process deviations or upsets occurred during any of the testing periods.

The emissions data and supporting data collected during the field testing can be found in Appendix A of this report. The emissions values and pertinent data are presented in the "Test Results Summary."



## 5. ANALYTICAL PROCEDURES

EQ and EQ's affiliates and subcontractors utilize all current analytical procedures outlined in the following reference methods as listed in the U.S. Code of Federal Regulations, Title 40, Part 60, Appendix A:

EPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Method 19 - Determination of Sulfur Dioxide Removal Efficiency, and Particulate Matter, Sulfur Dioxide and Nitrogen Oxide Emission Rates, also to determine Representative Fuel Factor.



## 6. QUALITY ASSURANCE PROCEDURES

Each reference method presented in the U.S. Code of Federal Regulations details the instrument calibration requirements, sample recovery and analysis, data reduction and verification, types of equipment required, and the appropriate sampling and analytical procedures to ensure maximum performance and accuracy. EQ and EQ's affiliates and subcontractors adhere to the guidelines for quality control set forth by the United States Environmental Protection Agency. These procedures are outlined in the following documents:

- Code of Federal Regulations, Title 40, Part 51
- Code of Federal Regulations, Title 40, Part 60
- Quality Assurance Handbook, Volume 1, EPA 600/9-76-005
- Quality Assurance Handbook, Volume 2, EPA 600/4-77-027a
- Quality Assurance Handbook, Volume 3, EPA 600/4-77-027b



## 7. CONCLUSIONS

An emissions testing program was conducted on the EU-WMSENGINE1, EU-WMSENGINE2 and EU-WMSENGINE3 at Wyandotte Municipal Services' plant in Wyandotte, Michigan on October 23-24, 2013. The emissions results reported elsewhere in this report indicated conformance with the emissions limitations established by MDEQ PTI 90-05 during the emissions testing program.

The usefulness and/or significance of the emissions values presented in this document as they relate to the compliance status of the emissions facilities tested based on process operating conditions shall be determined by others.

For additional information pertaining to the testing program see Appendix E at the end of this report.