mostardi platt

Mercury and Air Toxics Standard Particulate Matter and Hydrogen Chloride Emissions Test Report

Lansing Board of Water and Light
Eckert Station
Unit 6 ESP Outlet Duct
Lansing, Michigan
March 30 and 31, 2017

Report Submittal Date
May 4, 2017

Project No. M170903C

888 Industrial Drive
Elmhurst, Illinois 60126
630-993-2100

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating (RO) Permit program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name: Lansing Board of Water & Light County: Ingham

Source Address: 601 Island Ave City: Lansing

AQD Source ID (SRN): B2647 RO Permit No.: MI-ROP-B2647-2012c RO Permit Section No.:

Please check the appropriate box(es):

☐ **Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the RO Permit.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred.

☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

☒ **Other Report Certification**

Reporting period (provide inclusive dates): From na To na

Additional monitoring reports or other applicable documents required by the RO Permit are attached as described:

Eckert Unit 6 MATS PM and HCl Emisssions Test Report

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete.

Lori Myott	Manager, Environmental	517-702-6639
Name of Responsible Official (print or type)	Title	Phone Number
Signature of Responsible Official		5/8/2017 Date

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a Mercury and Air Toxics Standards (MATS) filterable particulate matter and hydrogen chloride emissions test program for the Lansing Board of Water and Light at the Eckert Station on the Unit 6 ESP Outlet Duct in Lansing, Michigan on March 30 and 31, 2017. This report summarizes the results of the test program and test methods used.

The test location, test dates, and test parameters are summarized below.

TEST INFORMATION		
Test Location	**Test Date**	**Test Parameters**
Unit 6 ESP Outlet Duct	March 30 and 31, 2017	Filterable Particulate Matter (FPM) and Hydrogen Chloride (HCl)

The purpose of the test program was to document FPM and HCl emissions to qualify for the LEE designation as required by 40 CFR Part 63, Subpart UUUUU. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS			
Test Location	**Test Parameter**	**Emission Limits**	**Emission Rates**
Unit 6 ESP Outlet Duct	FPM	≤0.030 lb/mmBtu	0.0071 lb/mmBtu
		≤0.015 lb/mmBtu (LEE Status)*	
	HCl	≤0.002 lb/mmBtu	0.0013 lb/mmBtu
		≤0.001 lb/mmBtu (LEE Status)**	

*LEE designation for FPM is established if the FPM emissions measured during the initial compliance test and all subsequent quarterly testing completed over the initial 3-year period are less than 50% of the applicable emission limit, which equates to 0.015 lb/mmBtu.

** LEE designation for HCl is established if the HCl emissions measured during the initial compliance test and all subsequent quarterly testing completed over the initial 3-year period are less than 50% of the applicable emission limit, which equates to 0.001 lb/mmBtu.

Emissions on lb/mmBtu basis were determined using a standard F_d-Factor of 9,820 dscf/mmBtu for sub-bituminous coal. Plant operating data as provided by Lansing Board of Water and Light is included in Appendix A.

The Stationary Source Audit Sample Program audit sample was obtained from ERA and submitted for analysis to Maxxam Analytical. The results of the audit sample was compared to the assigned value by ERA and found to be acceptable. The audit sample result and evaluation are appended to this report.

The identifications of individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Coordinator	Lansing Board of Water and Light 1232 Haco Drive P.O. Box 13007 Lansing , Michigan 48912	Ms. Trista Gregorski Environmental Engineer (517)702-6865 (phone) trista.gregorski@lbwl.com
Test Facility	Lansing Board of Water and Light Eckert Station 601 Island Ave Lansing, Michigan 48901	
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. A. Lawrence Sorce Project Supervisor (630) 993-2100 (phone) lsorce@mp-mail.com

The test crew consisted of Messrs. M. Karum, D. Kossack, J. Kukla, and A. L. Sorce of Mostardi Platt.

2.0 TEST METHODOLOGY

Emissions testing was conducted following the methods specified in 40CFR60, Appendix A. A schematic of the test section diagram is found in Appendix B and schematics of the sampling trains used are included in Appendix C. Calculation nomenclature and sample calculations are included in Appendix D. Laboratory analysis data are found in Appendix E. Copies of analyzer print-outs for each test run are included in Appendix F and field data sheets are found in Appendix G.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION				
Location	**Upstream Diameters**	**Downstream Diameters**	**Test Parameter**	**Number of Sampling Points**
Unit 6 ESP Outlet Duct	0.49	1.95	FPM, HCl	32

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate. An S-type pitot tube, differential pressure gauge, thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A. An ECOM analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H and copies of the gas cylinder certifications are found in Appendix I.

Method 5 Filterable Particulate Matter (FPM) Determination

Stack gas FPM concentrations and emission rates were determined in accordance with USEPA Method 5, 40CFR60, Appendix A. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method. Filter and probe temperatures were elevated to 320° Fahrenheit as described in 40CFR63, Subpart UUUUU. Particulate matter in the sample probe was recovered using an acetone rinse. The probe wash and filter catch were analyzed by Mostardi Platt in accordance with the Method in the Elmhurst, Illinois laboratory. Sample analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 26A Hydrogen Chloride (HCl) Determination

Stack gas HCl concentrations and emission rates were determined in accordance with Method 26A, 40CFR60, Appendix A. An Environmental Supply Company sampling train was used to sample stack gas, in the manner specified in the Method. Analyses of the samples collected were conducted by Maxxam Analytics, Inc. of Mississauga, Ontario. Sample analysis data are found in Appendix E. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

3.0 TEST RESULT SUMMARIES

Client: Lansing Board of Water and Light
Facility: Eckert Station
Test Location: Unit 6 ESP Outlet Duct
Test Method: 5 MATS

Source Condition	High Load	High Load	High Load	
Date	3/30/17	3/31/17	3/31/17	
Start Time	15:50	9:00	11:46	
End Time	18:05	11:15	14:01	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	329.4	319.8	333.9	327.7
Flue Gas Moisture, percent by volume	10.3%	11.3%	11.9%	11.2%
Average Flue Pressure, in. Hg	28.20	28.01	28.01	28.07
Gas Sample Volume, dscf	68.199	74.414	76.572	73.062
Average Gas Velocity, ft/sec	48.830	54.623	55.599	53.017
Gas Volumetric Flow Rate, acfm	263,681	294,963	300,232	286,292
Gas Volumetric Flow Rate, dscfm	149,032	165,856	164,695	159,861
Gas Volumetric Flow Rate, scfm	166,189	186,925	186,901	180,005
Average $\%CO_2$ by volume, dry basis	13.6	14.0	13.5	13.7
Average $\%O_2$ by volume, dry basis	5.4	4.9	5.5	5.3
Isokinetic Variance	98.3	96.4	99.9	98.2
Standard Fuel Factor Fd, dscf/mmBtu	9,820.0	9,820.0	9,820.0	9,820.0
Filterable Particulate Matter (Method 5 MATS)				
grams collected	0.0308	0.0099	0.0111	0.0173
mg/dscm	15.928	4.703	5.124	8.5849
grains/acf	0.0039	0.0012	0.0012	0.0021
grains/dscf	0.0070	0.0021	0.0022	0.0038
lb/hr	8.890	2.921	3.160	4.990
lb/mmBtu (Standard Fd Factor)	0.0132	0.0038	0.0043	0.0071

Client: Lansing Board of Water and Light
Facility: Eckert Station
Test Location: Unit 6 ESP Outlet Duct
Test Method: 26A

Source Condition	High Load	High Load	High Load	
Date	3/30/17	3/31/17	3/31/17	
Start Time	16:40	8:40	10:40	
End Time	18:23	10:23	12:23	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	336.0	331.1	334.5	333.9
Flue Gas Moisture, percent by volume	11.4%	11.5%	11.5%	11.5%
Average Flue Pressure, in. Hg	28.20	28.01	28.01	28.07
Gas Sample Volume, dscf	67.977	71.983	70.692	70.217
Average Gas Velocity, ft/sec	51.843	55.459	55.809	54.370
Gas Volumetric Flow Rate, acfm	279,953	299,477	301,370	293,600
Gas Volumetric Flow Rate, dscfm	154,991	165,561	165,842	162,131
Gas Volumetric Flow Rate, scfm	174,998	187,086	187,455	183,180
Average $\%CO_2$ by volume, dry basis	13.6	14.0	13.5	13.7
Average $\%O_2$ by volume, dry basis	5.4	4.9	5.5	5.3
Isokinetic Variance	100.5	99.6	97.7	99.3
Standard Fuel Factor Fd, dscf/mmBtu	9,820.0	9,820.0	9,820.0	9,820.0
Hydrogen Chloride (HCl) Emissions				
ug of sample collected	4400	2300	2800	3167
ppm	1.51	0.74	0.92	1.06
mg/dscm	2.29	1.13	1.40	1.61
lb/hr	1.327	0.700	0.869	0.965
lb/mmBtu (Standard Fd Factor)	0.0019	0.0009	0.0012	0.0013

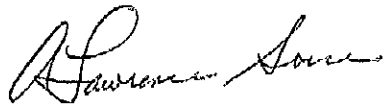
4.0 CERTIFICATION

MOSTARDI PLATT is pleased to have been of service to Lansing Board of Water and Light. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

CERTIFICATION

As project manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results, and the test program was performed in accordance with the methods specified in this test report.

MOSTARDI PLATT



Program Manager

A. Lawrence Sorce

Quality Assurance

Scott W. Banach