



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

**Lansing Board of Water and Light
Erickson Station
Unit 1 Stack
Lansing, Michigan
September 13 and 14, 2017**

**Report Submittal Date
October 13, 2017**

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Mostardi Platt

Project No. M172506D

1.0 EXECUTIVE SUMMARY AIR QUALITY DIVISION

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 Erickson Station on the Unit 1 Stack in Lansing, Michigan on September 13 and 14, 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 Dates	Test Parameters
Unit 1 Stack	September 13 and 14, 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	LEE Emission Limits	Emission Rates
Unit 1 Stack	FPM	≤0.030 lb/mmBtu	≤0.015 lb/mmBtu	0.0118 lb/mmBtu
	HCl	≤0.002 lb/mmBtu	≤0.001 lb/mmBtu	0.0010 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 Mostardi Platt. The results of the audit sample were 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 the 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 Erickson Station 3725 South Canal Road Lansing, Michigan 48917	
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Stuart Burton Project Manager (630) 993-2100 (phone) Sburton34@mp-mail.com

The test crew consisted of Messrs. B. Collins, B. Garcia, M. Newsome, P. Lyons, and S. Burton 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 1 Stack	7.9	11.3	FPM, HCl	12

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 (O₂)/Carbon Dioxide (CO₂) 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 Mostardi Platt. 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: Erickson Station
Test Location: Unit 1 Stack
Test Method: 5 MATS

	Source Condition	High Load	High Load	High Load	
	Date	9/13/17	9/13/17	9/13/17	
	Start Time	10:36	14:02	16:42	
	End Time	13:26	16:21	18:54	
		Run 1	Run 2	Run 3	Average
Stack Conditions					
Average Gas Temperature, °F		329.0	329.3	328.2	328.8
Flue Gas Moisture, percent by volume		10.3%	11.8%	11.1%	11.1%
Average Flue Pressure, in. Hg		29.49	29.49	29.49	29.49
Gas Sample Volume, dscf		71.032	71.997	71.047	71.359
Average Gas Velocity, ft/sec		49.957	50.602	49.717	50.092
Gas Volumetric Flow Rate, acfm		680,358	689,144	677,090	682,197
Gas Volumetric Flow Rate, dscfm		402,308	400,646	397,314	400,089
Gas Volumetric Flow Rate, scfm		448,698	454,324	446,991	450,004
Average %CO ₂ by volume, dry basis		13.6	13.9	13.9	13.8
Average %O ₂ by volume, dry basis		5.5	5.4	5.3	5.4
Isokinetic Variance		101.2	103.0	102.5	102.2
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		0.02717	0.03083	0.02895	0.02898
grains/acf		0.0035	0.0038	0.0037	0.0037
grains/dscf		0.0059	0.0066	0.0063	0.0063
lb/hr		20.352	22.690	21.412	21.485
lb/mmBtu (Standard Fd Factor)		0.0112	0.0125	0.0118	0.0118

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AIR QUALITY DIVISION

Client: Lansing Board of Water and Light
 Facility: Erickson Station
 Test Location: Unit 1 Stack
 Test Method: 26A

	Source Condition	High Load	High Load	High Load	
	Date	9/14/17	9/14/17	9/14/17	
	Start Time	7:10	9:47	12:23	
	End Time	9:23	12:00	14:35	
	Run 1	Run 2	Run 3	Average	
Stack Conditions					
Average Gas Temperature, °F		317.5	325.3	325.8	322.9
Flue Gas Moisture, percent by volume		11.5%	11.7%	11.4%	11.5%
Average Flue Pressure, in. Hg		29.58	29.58	29.58	29.58
Gas Sample Volume, dscf		71.653	73.328	74.256	73.079
Average Gas Velocity, ft/sec		50.324	51.165	51.371	50.953
Gas Volumetric Flow Rate, acfm		685,355	696,805	699,614	693,925
Gas Volumetric Flow Rate, dscfm		407,332	409,076	411,685	409,364
Gas Volumetric Flow Rate, scfm		460,079	463,099	464,720	462,633
Average %CO ₂ by volume, dry basis		13.2	13.6	13.4	13.4
Average %O ₂ by volume, dry basis		5.9	5.6	5.8	5.8
Isokinetic Variance		100.1	102.0	102.6	101.6
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		2394.3	2324.9	2574.3	2431.2
ppm		0.78	0.74	0.81	0.77
mg/dscm		1.18	1.12	1.22	1.17
lb/hr		1.80	1.72	1.89	1.80
lb/mmBtu (Standard Fd Factor)		0.0010	0.0009	0.0010	0.0010


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



Stuart L. Burton

Program Manager



Scott W. Banach

Quality Assurance