



**Mercury Relative Accuracy Test Audit
Test Report**

**Lansing Board of Water and Light
Erickson Station
Unit 1 Stack
Lansing, Michigan
August 13, 2019**

**Report Submittal Date
September 3, 2019**

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Project No. M193209C

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY	1
2.0 TEST METHODOLOGY	2
Mercury Determination by Method 30B (Sorbent Trap Method).....	2
3.0 TEST RESULT SUMMARY	3
4.0 CERTIFICATION.....	4
APPENDIX	
Appendix A - Test Section Diagram	6
Appendix B - Sample Train Diagrams	8
Appendix C - Calculation Nomenclature and Formulas	10
Appendix D - Sample Analysis Data	14
Appendix E - Mercury QA/QC Data	21
Appendix F - Reference Method Test Data (Computerized Sheets).....	28
Appendix G - Continuous Emissions Monitoring System Data and Plant Operating Data.....	34
Appendix H - Calibration Data.....	72
Appendix I - Field Data Sheets	80

1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a mercury (Hg) continuous emission monitoring system (CMMS) relative accuracy test audit (RATA) test program for Lansing Board of Water and Light at the Erickson Station in Lansing, Michigan on the Unit 1 Stack on August 13, 2019. This report summarizes the results of the test program and test methods used.

The test location, test dates, and test parameter is summarized below.

TEST INFORMATION		
Test Location	Test Dates	Test Parameter
Unit 1 Stack	August 13, 2019	Mercury (Hg)

The purpose of this test program was to determine the relative accuracy of the CMMS during specified operating conditions in units of micrograms per dry standard cubic meters ($\mu\text{g}/\text{dscm}$). The test consisted of eleven (11) paired Method 30B Hg sampling runs performed on August 13, 2019. Each sample was extracted at three test points. Reference method and CMMS traps were analyzed onsite utilizing an Ohio Lumex analyzer. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

RELATIVE ACCURACY TEST AUDIT TEST RESULTS SUMMARY			
Parameter	Units	Relative Accuracy Acceptance Criteria*	Relative Accuracy (RA)
Hg	$\mu\text{g}/\text{dscm}$	$\leq 0.5 \text{ ug/dscm}$ mean difference plus the confidence coefficient (cc)	0.127 ug/dscm mean difference + cc

*APS for emission sources < 2.5 $\mu\text{g}/\text{dscm}$ of mercury

The test results from this test program indicate that the CMMS pass criteria for relative accuracy as detailed in the United States Environmental Protection Agency (USEPA) annual RATA Performance Specification 12B, as published in 40 CFR Part 60.

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	Mr. Nathan Hude Environmental Regulatory Compliance (517) 490-3069 (cell phone) nathan.hude@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. Michal Liinski Senior Project Manager (630) 993-2100 (phone) mlipinski@mp-mail.com

The test crew consisted of Messrs. B. Garcia, E. Chan, J. Carlson, L. Sorce, and C. Jensen of Mostardi Platt.

2.0 TEST METHODOLOGY

Emissions testing was conducted following the methods specified in 40 CFR, Part 60, Appendix A and Appendix B, Performance Specification 12B. A drawing depicting the sampling ports and test point locations is found in Appendix A, drawings depicting sampling trains are found in Appendix B, calculation and nomenclature explanations are found in Appendix C, sample analysis data are found in Appendix D, mercury sampling QA/QC data are found in Appendix E, reference test method data are found in Appendix F, CMMS data are found in Appendix G, calibration data are found in Appendix H, and copies of field data sheets are included in Appendix I.

The following methodology was used during the test program:

Mercury Determination by Method 30B (Sorbent Trap Method)

Paired trains were utilized sampling three test points at the Unit 1 Stack test location.

Per Method 30B sampling, each sample was collected on the paired in-situ sorbent traps. A tube of silica was used to capture remaining moisture prior to the sample reaching the gas metering system.

The sample train used for this test program was designed by APEX, Inc. and meets all requirements for Method 30B sampling. Samples were analyzed onsite utilizing an Ohio Lumex, Inc. analyzer for total gaseous mercury.

3.0 TEST RESULT SUMMARY

Client: Lansing Board of Water and Light				Location: Unit 1 Stack				
Plant: Erickson Station				Date: 8/13/19				
Project #: M193209				Test Method: Sorbent Hg (30B)				
Hg ug/dscm RATA								
CMMS Monitor Information								
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM ug/dscm	CMMS ug/dscm	(RM-CMMS) Difference (di)	(RM-CMMS) Difference ² (di ²)
0	1	08/13/19	7:10	7:40	1.221	0.725	0.496	0.246
1	2	08/13/19	8:44	9:14	0.877	1.066	-0.189	0.036
1	3	08/13/19	10:04	10:34	0.827	0.768	0.059	0.003
1	4	08/13/19	10:49	11:19	0.736	0.756	-0.020	0.000
1	5	08/13/19	11:48	12:18	0.620	0.636	-0.016	0.000
1	6	08/13/19	12:39	13:09	0.574	0.601	-0.027	0.001
1	7	08/13/19	13:29	13:59	0.623	0.588	0.035	0.001
1	8	08/13/19	14:21	14:51	0.559	0.732	-0.173	0.030
1	9	08/13/19	17:08	17:38	0.592	0.647	-0.055	0.003
1	10	08/13/19	17:54	18:24	0.692	0.833	-0.141	0.020
0	11	08/13/19	18:37	18:42	0.617	0.814	-0.197	0.039
n					9			
t(0.025)					2.306			
Mean Reference Method Value					0.678		RM avg	
Mean CMM Value					0.736		CMM avg	
Sum of Differences					-0.527		di	
Mean Difference					-0.059		d	
Sum of Differences Squared					0.095		di²	
Standard Deviation					0.089		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.069		cc	
Relative Accuracy-APS					0.127		RA^A	

^A Relative Accuracy based on mean difference of +/-0.5 ug/dscm plus CC for emission sources <2.5 ug/dscm of mercury

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



Project Manager

Michal Lipinski



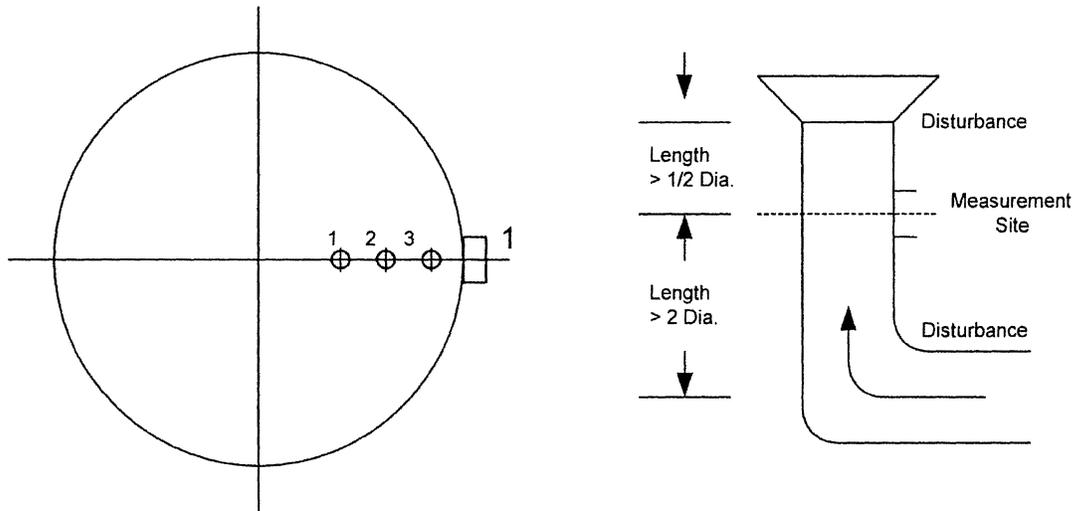
Quality Assurance

Scott W. Banach

APPENDICES

Appendix A- Test Section Diagram

GASEOUS TRAVERSE FOR ROUND DUCTS



Job: Lansing Board of Water and Light
 Erickson Station
 Lansing, Michigan

Distance from inside wall
 at port to traverse point:

Date: August 13, 2019

1. 6.56 Feet (2.0 Meters)
2. 3.94 Feet (1.2 Meters)
3. 1.31 Feet (0.4 Meters)

Test Location: Unit 1 Stack

Stack Diameter (Feet): 17.0

Stack Area (Square Feet): 226.98

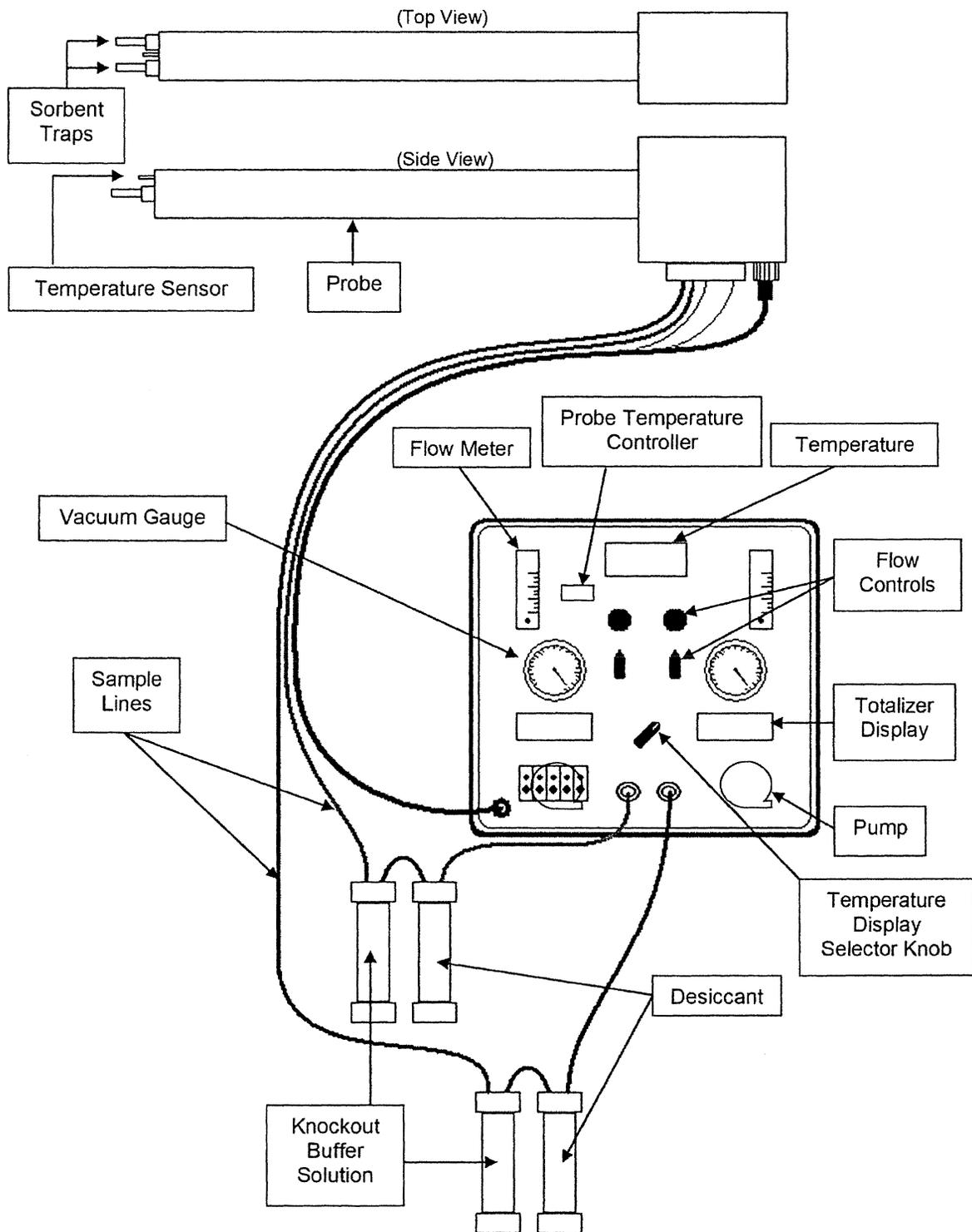
No. Sample Points: 3

No of Ports: 1

Port Length (Inches): 78.0

Appendix B- Sample Train Diagram

USEPA Method 30B- Mercury Sorbent Trap Sampling Train



Appendix C- Calculation Nomenclature and Formulas

Plant: Erickson Station
 Test Location: Unit 1 Stack
 Run: 1A
 Date: 8/13/2019

Mercury Meter Volume at Standard Conditions (Liters)

$$Vm(std) = 17.647 \times Y \times Vm \times \frac{Pbar}{Tm}$$

$$Y = \frac{0.991}{\quad} \quad Vm = \frac{21.127}{\quad}$$

$$Tm = \frac{526.43}{\quad}$$

$$Vm(std) = \frac{20.143}{\quad}$$

Hg Concentration:

$$ppb \text{ Hg} = (\text{ng of Hg} / 1 \times 10^9) \times (0.002046226 / Vm(std) \times 0.0353) \times 385 \times 10^6 / 200.59 \times 1000$$

$$\text{Total ng Hg} = \frac{24.4}{\quad} \quad Vm(std) = 20.142976$$

$$ppb \text{ Hg} = \frac{0.145}{\quad}$$

$$\mu\text{g/dscm} = (\text{total ng of Hg on trap} / 1000) / Vm(std) / 1000$$

$$\mu\text{g/dscm} = \frac{1.211}{\quad}$$