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Relative Accuracy Test Audit Test Report

Lansing Board of Water and Light
Delta Energy Park Facility
EUCTGHRSG3 Bypass Stack
Lansing, Michigan
Project No. M233603B
November 15, 2023

mostardi  platt

B4001



**Relative Accuracy Test Audit
Test Report**

**Lansing Board of Water and Light
Delta Energy Park Facility
EUCTGHRSG3 Bypass Stack
Lansing, Michigan 48917
November 15, 2023**

**Report Submittal Date
December 12, 2023**

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Project No. M233603B

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1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a Continuous Emissions Monitoring System (CEMS) Relative Accuracy Test Audit (RATA) test program for Lansing Board of Water and Light at the Delta Energy Park Facility in Lansing, Michigan, on the EUCTGHRSG3 Bypass Stack on November 15, 2023. This report summarizes the results of the test program and test methods used in accordance with the Mostardi Platt Protocol M233603B dated September 25, 2023. Mostardi Platt is a self-certified air emissions testing body (AETB). A copy of Mostardi Platt's self-certification can be found in Appendix A. Mostardi Platt is a self-certified air emissions testing body (AETB). A copy of Mostardi Platt's self-certification can be found in Appendix A.

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

TEST INFORMATION		
Test Location	Test Date	Test Parameters
EUCTGHRSG3 Bypass Stack	November 15, 2023	Oxygen (O ₂) and Nitrogen Oxides (NO _x)

The purpose of the test program was to demonstrate the relative accuracies of the EUCTGHRSG3 Bypass Stack O₂ and NO_x analyzers during the specified operating conditions. The test results from this test program indicate that each CEMS component meets the United States Environmental Protection Agency (USEPA) annual performance specification for relative accuracy as published in 40 Code of Federal Regulations Part 75 (40CFR75).

RATA RESULTS						
Test Location	Date	Parameter	Units	Relative Accuracy Acceptance Criteria	Relative Accuracy (RA)	Bias Adjustment Factor (BAF)
EUCTGHRSG3 Bypass Stack	11/15/23	NO _x	lb/mmBtu	≤ 7.5% of the mean reference value	3.59%	1.033
		O ₂	% dry	≤ 7.5% of the mean reference value	2.20%	N/A

The gas cylinders used to perform the RATA are summarized below.

GAS CYLINDER INFORMATION				
Parameter	Gas Vendor	Cylinder Serial Number	Cylinder Value	Expiration Date
NO _x	Airgas	CC331452	0.0 ppm	12/18/2025
NO _x	Airgas	CC237509	25.31 ppm	11/15/2024
NO _x	Airgas	XC031027B	45.02 ppm	5/17/2026
O ₂	Airgas	CC237509	0.0%	11/15/2024
O ₂	Airgas	CC331452	11.92%	12/18/2025
O ₂	Airgas	CC499531	22.47%	12/14/2030

No deviations, additions, or exclusions from the test protocol, test methods, the Mostardi Platt Quality Manual, or the ASTM D7036-12 occurred. The specific test conditions encountered did not interfere with the collection of the data.

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	Nathan Hude Environmental Regulatory Compliance (517) 702-6170 (cell phone) nathan.hude@lbwl.com
Test Facility	Lansing Board of Water and Light Delta Energy Park Facility 3725 South Canal Road Lansing, Michigan 48917 Permit to Install 74-18C	
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Jeffery Gross Project Manager 630-993-2100 (phone) jgross@mp-mail.com
Testing Company Personnel		Mr. Elliot Flynn Test Technician

Copies of the QI certifications for test personnel are included in Appendix B.

2.0 TEST METHODOLOGY

Emission testing was conducted following the United States Environmental Protection Agency (USEPA) methods specified in 40CFR75 and 40CFR60, Appendix A in addition to the Mostardi Platt Quality Manual and the test protocol. Schematics of the test section diagrams and sampling trains used are included in Appendix C and D respectively. Calculation and nomenclature are included in Appendix E. Copies of analyzer print-outs for each test run are included in Appendix F. CEM data and process data as provided by Lansing Board of Water and Light are included in Appendix G.

The following methodologies were used during the test program:

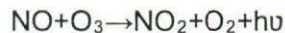
Method 3A Oxygen (O₂) Determination

Bypass Stack gas O₂ concentrations were determined in accordance with USEPA Method 3A, 40CFR60, Appendix A. An O₂ analyzer was used to determine the O₂ concentrations in the manner specified in the Method. The instrument has a paramagnetic detector and the O₂ operates in the nominal range of 0% to 25% with the specific range determined by the high-level calibration gas of 22.47%. High-range calibrations were performed using USEPA Protocol gas. Zero nitrogen (a low ppm pollutant in balance nitrogen calibration gases) was introduced during other instrument calibrations to check instrument zero. High- and a mid-range % O₂ levels in balance nitrogen were also introduced. Zero and mid-range calibrations were performed using USEPA Protocol gas after each test run. Copies of the gas cylinder certifications are found in Appendix I. This testing met the performance specifications as outlined in the Method.

Method 7E Nitrogen Oxides (NO_x) Determination

Bypass Stack gas NO_x concentrations and emission rates were determined in accordance with USEPA Method 7E, 40CFR60, Appendix A. A Thermo Scientific Model 42iQSL Chemiluminescence Nitrogen Oxides Analyzer was used to determine nitrogen oxides concentrations, in the manner specified in the Method. The instrument operated in the nominal range of 0 ppm to 50 ppm with the specific range determined by the high-level span calibration gas of 45.02 ppm.

The Model 42iQSL High Level is based on the principle that nitric oxide (NO) and ozone (O₃) react to produce a characteristic luminescence with an intensity linearly proportional to the NO concentration. Infrared light emission results when electronically excited nitrogen dioxide (NO₂) molecules decay to lower energy states. Specifically,



NO₂ must first be transformed into NO before it can be measured using the chemiluminescent reaction. NO₂ is converted to NO by a molybdenum NO₂-to-NO converter heated to about 324°C. The flue gas air sample is drawn into the Model 42iQSL High Level through the sample bulkhead. The sample flows through a particulate filter, a capillary, and then to the mode solenoid valve. The solenoid valve routes the sample either straight to the reaction chamber (NO mode) or through the NO₂-to-NO converter and then to the reaction chamber (NO_x mode).

Dry air enters the Model 42iQSL High Level through the dry air bulkhead, through a flow sensor, and then through a silent discharge ozonator. The ozonator generates the necessary ozone concentration needed for the chemiluminescent reaction. The ozone reacts with the NO in the ambient air sample to produce electronically excited NO₂ molecules. A photomultiplier tube (PMT) housed in a thermoelectric cooler detects the NO₂ luminescence.

The NO and NO_x concentrations calculated in the NO and NO_x modes are stored in memory. The difference between the concentrations is used to calculate the NO₂ concentration. The Model 42iQSL High Level outputs NO, NO₂, and NO_x concentrations to both the front panel display and the analog outputs.

Bypass Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the Bypass Stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using USEPA Protocol gases introduced at the probe, before and after each test run. This testing met the performance specifications as outlined in the Method.

A list of calibration gases used and the results of all calibration and other required quality assurance checks are found in Appendix H. Copies of the gas cylinder certifications are found in Appendix I. The NO₂ to NO converter test can be found in Appendix J. This testing met the performance specifications as outlined in the Method.

3.0 TEST RESULT SUMMARIES

Client: Lansing Board of Water and Light				Location: EUCTGHRSG 3 Bypass Stack				
Facility: Delta Energy Park				Date: 11/15/23				
Project #: M233603				Test Method: 7E, 3A				
Fuel Type: Natural Gas				Fuel Factor: 8710				
O2 based NOx lb/mmBtu RATA								
CEM Analyzer Information								
NO_x Monitor/Model:		Thermo 42iQSL		NO_x Serial # :		1192744584		
O2 Monitor/Model:		Thermo 42iQSL		O2 Serial # :		1192744584		
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM NO _x lb/MMBtu	CEM NO _x lb/MMBtu	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	11/15/23	08:01	08:21	0.066	0.064	0.002	0.000004
1	2	11/15/23	08:30	08:50	0.066	0.064	0.002	0.000004
1	3	11/15/23	09:00	09:20	0.066	0.064	0.002	0.000004
1	4	11/15/23	09:30	09:50	0.066	0.064	0.002	0.000004
1	5	11/15/23	09:59	10:19	0.066	0.063	0.003	0.000009
1	6	11/15/23	10:29	10:49	0.065	0.063	0.002	0.000004
0	7	11/15/23	10:58	11:18	0.066	0.063	0.003	0.000009
1	8	11/15/23	11:28	11:48	0.066	0.064	0.002	0.000004
1	9	11/15/23	11:58	12:18	0.066	0.064	0.002	0.000004
1	10	11/15/23	12:27	12:47	0.066	0.064	0.002	0.000004
n					9			
t(0.025)					2.306			
Mean Reference Method Value					0.066		RM avg	
Mean CEM Value					0.064		CEM avg	
Sum of Differences					0.019		di	
Mean Difference					0.002		d	
Sum of Differences Squared					0.000		di²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy					3.59		RA	
Bias Adjustment Factor					1.033		BAF	

Client: Lansing Board of Water and Light **Location:** EUCTGHRSG 3 Bypass Stack
Facility: Delta Energy Park **Date:** 11/15/23
Project #: M233603 **Test Method:** 3A
O₂ % (dry) RATA
CEM Analyzer Information

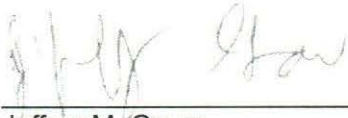
O ₂ Monitor/Model:		Thermo 42iQSL			O ₂ Serial # :		1192744584	
1=accept 0=reject	Test Run	Test Date	Start Time	End Time	RM O ₂ % (dry)	CEM O ₂ % (dry)	(RM-CEM) Difference (di)	(RM-CEM) Difference ² (di ²)
1	1	11/15/23	08:01	08:21	13.6	13.9	-0.3	0.09
1	2	11/15/23	08:30	08:50	13.6	13.9	-0.3	0.09
1	3	11/15/23	09:00	09:20	13.6	13.9	-0.3	0.09
1	4	11/15/23	09:30	09:50	13.6	13.9	-0.3	0.09
1	5	11/15/23	09:59	10:19	13.6	13.9	-0.3	0.09
1	6	11/15/23	10:29	10:49	13.6	13.9	-0.3	0.09
1	7	11/15/23	10:58	11:18	13.7	14.0	-0.3	0.09
1	8	11/15/23	11:28	11:48	13.7	14.0	-0.3	0.09
1	9	11/15/23	11:58	12:18	13.7	14.0	-0.3	0.09
0	10	11/15/23	12:27	12:47	13.7	14.0	-0.3	0.09
n					9			
t(0.025)					2.306			
Mean Reference Method Value					13.633		RM avg	
Mean CEM Value					13.933		CEM avg	
Sum of Differences					-2.700		di	
Mean Difference					-0.300		d	
Sum of Differences Squared					0.810		di ²	
Standard Deviation					0.000		sd	
Confidence Coefficient 2.5% Error (1-tail)					0.000		cc	
Relative Accuracy					2.20		RA	

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.

As the program 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. The test program was performed in accordance with the test protocol, test methods, the Mostardi Platt Quality Manual, and the ASTM D7036-12, as applicable.

MOSTARDI PLATT



Jeffery M. Gross

Program Manager



Scott W. Banach

Quality Assurance

APPENDICES

Appendix A - Company AETB Certification



March 23, 2012

Effective immediately, Mostardi Platt self-certifies that all Part 75 test projects conform to the ASTM D 7036-04 Standard Practice. The following contact information is provided as required by the Standard:

Mostardi Platt
888 Industrial Drive
Elmhurst, Illinois 60126

630-993-2100

tplatt@mp-mail.com

Also, attached is a list of each Qualified Individual (QI) with the type of exam (e.g., Group I, II, III IV and/or V), the date the exam was taken and the name and email address of the exam provider.

Should you have any questions or need additional information, please contact Thomas Platt, P.E. at 630-993-2683.

Approved:

By:

A handwritten signature in blue ink, appearing to read "Robert J. Platt", written over a horizontal line.

Robert J. Platt
Chief Executive Officer

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

QSTI AETB Import Data

QJ Last Name [REQUIRED]	QJ First Name [REQUIRED]	QJ Middle Initial	AETB Name [REQUIRED]	AETB Phone Number [REQUIRED]	AETB Email [REQUIRED]	Exam Date mm/dd/yyyy [REQUIRED]	Exam Provider Name [REQUIRED]	Exam Provider Email [REQUIRED]	Comment
Beckham	Kenneth	J	Mostard Platt	630-993-2100	tplatt@mp-mail.com	5/18/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Benninghoff	Aaron	W	Mostard Platt	630-993-2100	tplatt@mp-mail.com	9/8/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Burton	Stuart	L	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/4/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Carlisle	Robert	W	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/8/2021	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Colangelo	Nicholas	C	Mostard Platt	630-993-2100	tplatt@mp-mail.com	2/1/2019	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Coleman	Paul	F	Mostard Platt	630-993-2100	tplatt@mp-mail.com	3/22/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Crivlare	Jeffrey	M	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/4/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Crooks	Nate	J	Mostard Platt	630-993-2100	tplatt@mp-mail.com	11/9/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
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Gross	Jeffrey	M	Mostard Platt	630-993-2100	tplatt@mp-mail.com	11/20/2018	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Hendricks	Benjamin	W	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/30/2020	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Howe	Jacob	W	Mostard Platt	630-993-2100	tplatt@mp-mail.com	2/17/2021	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Jensen	Christopher	E	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/4/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Jones	Kyle	L	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/11/2021	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Kaschinske	Jordan	R	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/8/2021	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Kossack	Daniel	J	Mostard Platt	630-993-2100	tplatt@mp-mail.com	11/11/2021	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Kukla	Joshua	R	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/4/2019	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Lipinski	Michal		Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/31/2020	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
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Peterson	Mark	E	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/17/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Petrovich	William	A	Mostard Platt	630-993-2100	tplatt@mp-mail.com	2/4/2022	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Russ	Timothy	E	Mostard Platt	630-993-2100	tplatt@mp-mail.com	4/8/2020	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Sands	Stuart	T	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/5/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Sather	Michael	P	Mostard Platt	630-993-2100	tplatt@mp-mail.com	2/7/2020	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Simon	Ryan	K	Mostard Platt	630-993-2100	tplatt@mp-mail.com	1/19/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Sollars	Richard	J	Mostard Platt	630-993-2100	tplatt@mp-mail.com	7/28/2023	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Sorce	Angelo	M	Mostard Platt	630-993-2100	tplatt@mp-mail.com	2/18/2022	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)
Trezak	Christopher	S	Mostard Platt	630-993-2100	tplatt@mp-mail.com	4/14/2020	Source Evaluation Society	qstiprogram@gmail.com	Group V (Part 75)

Appendix B - QI Certification(s) for Field Personnel



Qualified Individual

Jeffrey M. Gross

Has satisfactorily completed the requirements of

ASTM D 7036 – 04, Section 8.3

Standard Practice for Competence of Air Emission Testing Bodies

Examinations provided by Source Evaluation Society: www.sesnews.org, (919) 544-6338

All Part 75 test methods, under my supervision, shall conform to the company's Quality Manual and to this practice, in all respects.

Passed Group V Exam on 11/20/18

Expiration Date: Group V on 11/20/23

Signature: _____

Handwritten signature of Jeffrey M. Gross in black ink.

Date: _____

Handwritten date 11/20/18 in black ink.

Quality Manager: _____

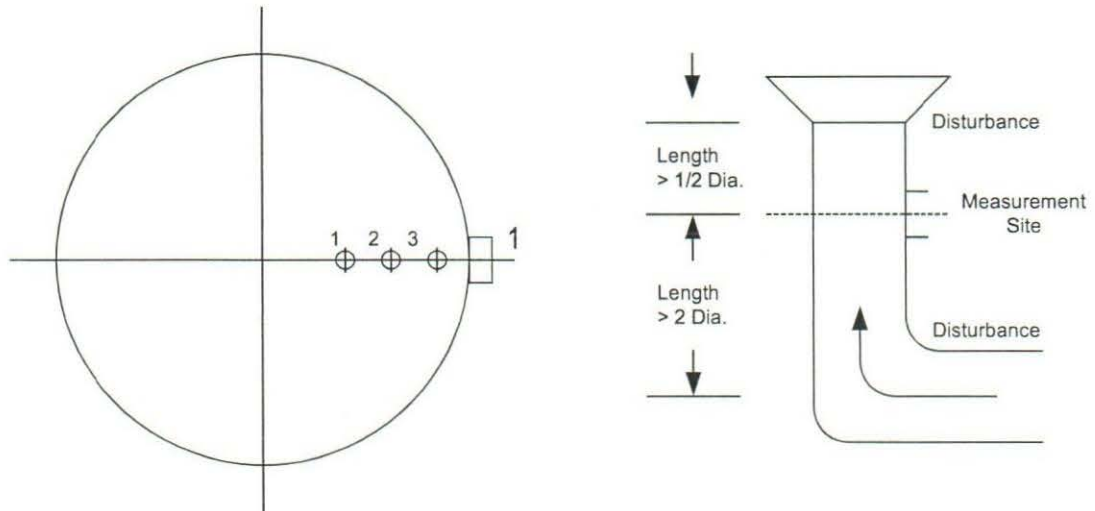
Handwritten signature of Thomas S. Platt in black ink.

Technical Director: _____

Handwritten signature of Thomas S. Platt in black ink.

Appendix C - Test Section Diagram

GASEOUS TRAVERSE FOR ROUND DUCTS



Job: Lansing Board of Water and Light
Delta Energy Park Facility
Lansing, Michigan

Date: November 15, 2023

Test Location: EUCTGHRSG3 Bypass Stack

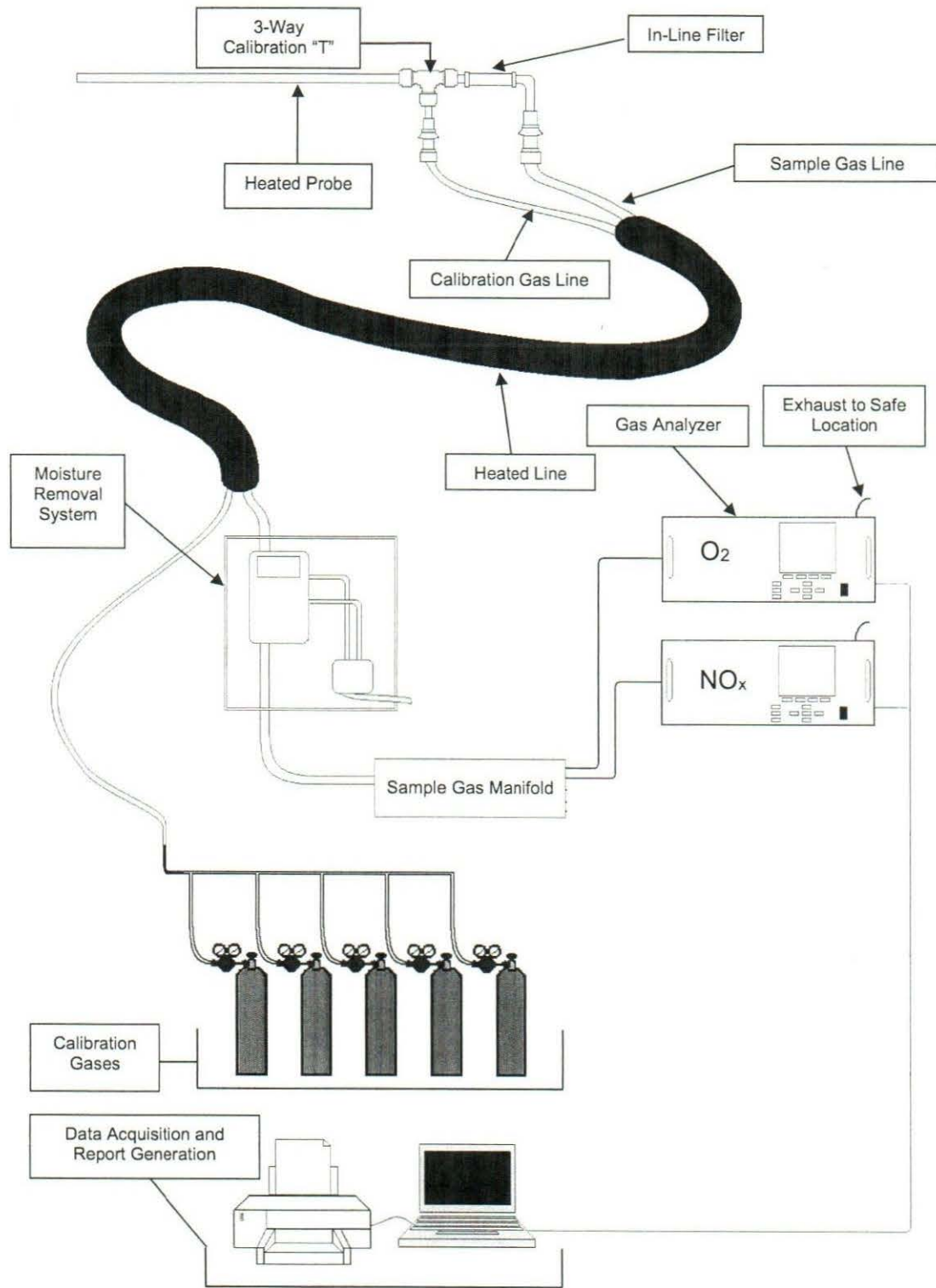
Stack Diameter: 11.901 Feet

Stack Area: 111.24 Square Feet

No. Sample Points: 3

Appendix D - Sample Train Diagram

USEPA Methods 3A and 7E Extractive Gaseous Sampling Diagram



Appendix E - Calculation Nomenclature and Formulas