

Annual RATA Testing Report

in accordance with 40CFR75

City of Tallahassee

**Plant Hopkins
Unit 1
Tallahassee, Florida**

July 2012

**Prepared By:
Spectrum Systems, Inc.
Pensacola, Florida**

Analyzers Tested:

TECO NOx Monitor:
TECO CO2 Monitor:

Hopkins 1
42C-69745-364
41CHL-68205-359



2602 Jackson Bluff Road, Tallahassee, Florida 32304, (850) 891-4YOU (4968), talgov.com

**CERTIFIED MAIL
RETURN/RECEIPT**

RECEIVED

AUG 23 2012

August 20, 2012

**DIVISION OF AIR
RESOURCE MANAGEMENT**

Mr. David McNeal
USEPA Region IV
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, Georgia 30303-3104

Mr. Syed Arif
Florida DEP
2600 Blair Stone Road
Mail Station 5510
Tallahassee, Florida 32399-2400

**Re: City of Tallahassee – Annual RATA Results
Arvah B. Hopkins Generating Station – Units 1, 2A, HC3 and HC4 – ORIS Code 688**

Gentlemen:

Enclosed please find the annual relative accuracy test audit report required by 40 CFR Part 75 for Arvah B. Hopkins Generating Station units 1, 2A, HC3 and HC4 (ORIS Code 688).

I am authorized to make this submission on behalf of the owners and operators of the affected sources or affected units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Sincerely,

Triveni Singh
Manager Electric Production
Designated Representative

cc: Florida Dept. of Environmental Protection
Northwest District Office
Air Resources Management
160 Governmental Center
Pensacola, Florida 32502-5794

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City of Tallahassee

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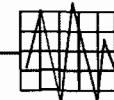
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Spectrum Systems, Inc.

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City of Tallahassee

Hopkins Unit 1

I. INTRODUCTION

City of Tallahassee contracted Spectrum Systems, Inc. of Pensacola, Florida to conduct Relative Accuracy Testing on the Plant Hopkins, Unit 1 Stack. The Plant Hopkins facility is located in Tallahassee, Florida. Testing was conducted on the Nitrogen Oxides (NO_x) Continuous Emissions Monitoring Systems (CEMS). Testing was conducted July 2012 by James Garrett of Spectrum Systems, Inc. This report contains the results of this testing.

Section II of this report, titled Installation and Source Description, gives a brief description of the Hopkins Facility and how it was operated during the test program.

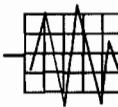
Section III of this report, titled Summary of Results, presents a discussion of the test results.

Section IV of this report contains the certification of authenticity for the testing.

Section V of this report contains the mathematical equations used to calculate the results.

Section VI of this report contains diagrams of Spectrum System's TCEMS.

Actual test data, materials, and test results are presented in the different appendices of this report.



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Annual RATA Testing, July 2012

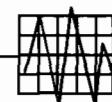
City of Tallahassee

Hopkins Unit 1

II. INSTALLATION and SOURCE DESCRIPTION

A dilution probe is installed at the Unit 1 stack with the analyzers housed in a dedicated temperature controlled shelter at the base of the stack. Further installation information can be obtained from the affected facility or the City of Tallahassee's Electric Production Department located in Tallahassee, Florida. The monitoring system is used for compliance with the Clean Air Act of 1990 by reporting mass emissions of Carbon Dioxide and emission rates of Nitrogen Oxides released into the atmosphere.

City of Tallahassee utilizes Unit 1 for the purpose of generating electricity. The unit is fired on Natural gas and Number 6 fuel oil. Potential emissions include the products of complete and incomplete combustion of the fuels, as well as any extraneous material. The gases then pass through a series of ducts to the base of the stack and then exhaust into the atmosphere.



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

III. SUMMARY OF RESULTS

Relative Accuracy testing was conducted on the Nitrogen Oxides (NO_x) Continuous Emissions Monitoring System (CEMS). All testing was performed at normal loads.

Testing was conducted according to the procedures in the Code of Federal Regulations, Title 40, Part 75 (40CFR75), Appendix A. As applicable, Reference Methods 3A and 7E, as defined in 40 CFR 60 Appendix A, were used to determine Oxygen and Nitrogen Oxides.

The NO_x Relative Accuracies were performed using 40CFR75 Appendix A Section 6.5. NO_x Relative Accuracy results must meet the criteria of 40CFR75 Appendix A, Section 3.3 and shall not exceed 10.0% (or 7.5% to achieve reduced RATA frequency incentive for annual RATAs). Exceptions are as follows:

Low NO_x emitting units (≤ 0.2 lb/mmBtu): the difference between the mean value of the CEMS measurements and the reference method mean value is not to exceed ± 0.02 lb/mmBtu whenever the Relative Accuracy is greater than 10% (or ± 0.015 lb/mmBtu for reduced RATA frequency).

All monitors tested for Relative Accuracy meet the required criteria.

This report contains a summary of all the testing performed and the supporting data for all tests. Detailed test material is presented in the different appendices of this report. Within each appendix, data is presented by unit. Refer to the header or footer information to pinpoint or sequence a group of data.

Test results are entered into the EPA's ECMPS Software.

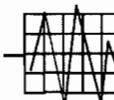
Appendix A of this report contains a printout of the detailed ECMPS testing results generated from the ECMPS software discussed above. This appendix includes summaries of the Relative Accuracy test data, as presented in the ECMPS-generated printout.

Appendix B of this report contains Gas Relative Accuracy reference method data. Gas reference method data include sampling system bias and drift results, average emission calculations, calibration data, and minute data and run averages.

Appendix C of this report contains all plant CEMS data associated with the RATA testing.

Appendix D of this report contains Quality Assurance data for the gas reference methods.

Appendix E of this report contains copies of the EPA Protocol Gas Certificates for the gases used during this testing.



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Hopkins Unit 1

IV. STATEMENT OF AUTHENTICITY

The sampling and analysis for this report was carried out my direction and supervision.

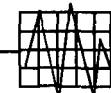
I have reviewed the testing details and results of this report and hereby certify that the data contained within is authentic and accurate to the best of my knowledge.

Date: July 26, 2012

Signature:



James Garrett (QSTI)
Testing Engineer



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

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Hopkins Unit 1

V. MATHEMATICAL EXPLANATION

The following equations are used in the Relative Accuracy monitor comparisons and the Lbs/mmBtu emission calculations in compliance with 40CFR60 Appendix B, Performance Specification 2, Sections 7 and 8.

Arithmetic Mean:

$$\bar{d} = \frac{1}{n} \sum_{i=1}^n d_i$$

Where,

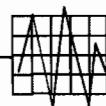
- n = Number of data points
- d = Arithmetic Mean
- di = The individual difference between the reference method and corresponding CEMS value for an individual data point.
- Σ = The summation of the individual differences di for all points

Standard Deviation:

$$S_d = \sqrt{\frac{n \sum_{i=1}^n d_i^2 - \left[\left(\frac{\sum_{i=1}^n d_i}{n} \right)^2 \right]}{n - 1}}$$

Where,

- n = Number of data points
- di = The individual difference between the reference method and corresponding CEMS value for an individual data point.
- Σ = The summation of the individual differences di for all points



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Confidence Coefficient:

$$CC = t_{0.025} \sqrt{\frac{S_d}{n}}$$

Where,

$t_{0.025}$ = T value from the table below:

n-1	$t_{0.025}$	n-1	$t_{0.025}$	n-1	$t_{0.025}$
1	12.706	12	2.179	23	2.069
2	4.303	13	2.160	24	2.064
3	3.182	14	2.145	25	2.060
4	2.776	15	2.131	26	2.056
5	2.571	16	2.120	27	2.052
6	2.447	17	2.110	28	2.048
7	2.365	18	2.101	29	2.045
8	2.306	19	2.093	30	2.042
9	2.262	20	2.086	40	2.021
10	2.228	21	2.080	60	2.000
11	2.201	22	2.074	>80	1.980

Relative Accuracy:

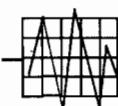
$$RA = \frac{|\bar{d}| + |\bar{cc}|}{\bar{RM}} \times 100$$

Where,

$|\bar{d}|$ = The absolute value of the mean difference between Reference Method values and CEMS Monitor Readings

$|\bar{cc}|$ = The absolute value of the confidence coefficient

\bar{RM} = The absolute value of the reference method value or applicable standard



Spectrum Systems, Inc.

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Emission Calculations

Reference method testing data analysis is performed using Title 40 of the Code of Federal Regulations, Part 60, Appendix A, Method 19. Measurements of pollutants and diluent gases in any combination of wet and dry instrument responses are detailed. "F" factor analysis techniques are used on both the CEMS and the TCEMS wherever possible. Plug values for moisture are applied when necessary, to compensate for ambient or added moisture gas phase dilution.

For pollutants measured on a wet basis with dry Oxygen diluent, emissions in pounds of pollutant per hour are calculated by the formula:

$$\text{Emission Lbs/mmBtu} = (\text{PPMd} \times \text{Fd} \times \text{K} \times 20.9) / (20.9 \times \%O_2 d)$$

Where:

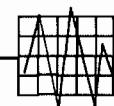
E	=	Emission in lbs/mmBtu
PPMd	=	Pollutant Concentration in dry ppm
Fd	=	Fuel Factor in dscf/mmBtu = 8710 for Natural Gas
%O ₂ d	=	Oxygen Fraction in Flue Gas in % by volume dry
K	=	Conversion Factor in lbs/scf. NOx Conversion Factor = 1.194 E-7

For the pollutants measured with a wet CO₂ diluent measurement the following formula is used:

$$\text{Emission Lbs/mmBtu} = \text{PPMw} \times \text{Fc} \times \text{K} \times (100 / \%w\text{CO}_2)$$

Where:

E	=	Pollutant Emission Concentration in lbs/mmBtu
PPMw	=	Pollutant Concentration in wet ppm
Fc	=	Fuel Factor in scf/mmBtu = 1040 for Natural Gas (1420 for Fuel Oil)
%wCO ₂	=	Wet Carbon Dioxide in Flue Gas in % by volume
K	=	Conversion Factor NOx Conversion Factor = 1.194 E-7



Spectrum Systems, Inc.

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Corrected Gas Pollutant Concentration

Calculate the correction for the gas analyzer measured gas concentrations in ppm, using sampling bias and drift measurements of EPA Protocol 1 zero and higher calibration gas concentrations.

When CO₂ is used as the diluent gas during analysis, NOx and CO₂ ppm corrected readings are calculated using equation in 40 CFR 60 Appendix A Reference Method 6C Section 8 Equation 6C-1. (Reference 40 CFR 60 Appendix A Reference Method 3A Section 9 for CO₂ AND 40 CFR Appendix A Reference Method 7E Section 8 for NOx BOTH reference procedure 40 CFR 60 Appendix A Reference Method 6C Section 8, Equation 6C-1.)

$$C_{\text{gas}} = C_{\text{ma}} * (C_{\text{avg}} - C_0) / (C_m - C_0)$$

Where:

- C_{gas} = Corrected effluent gas concentration in ppm
- C_{ma} = Actual upscale calibration gas concentration in ppm
- C_{avg} = Gas analyzer reading in ppm
- C₀ = Average of initial and final system calibration bias check response for the zero gas
- C_m = Average of initial and final system calibration bias check response for the upscale gas

Sampling System Bias and Calibration Drift

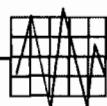
Sampling system bias and calibration drift data corrections are applied to the run's analyzer measurements. The NOx emissions were computed from each set of NOx and O₂ or NOx and CO₂ analyzer measurements.

Sampling Bias in percent of span is calculated by the formula:

$$\text{Sampling Bias} = (100 (\text{System Cal Response} - \text{Analyzer Cal Response})) / \text{Span}$$

Calibration Drift in % of Span is calculated by the formula:

$$\text{Calibration Drift} = (100(\text{Final System Cal Response} - \text{Initial System Cal Response})) / \text{Span}$$



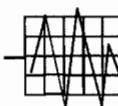
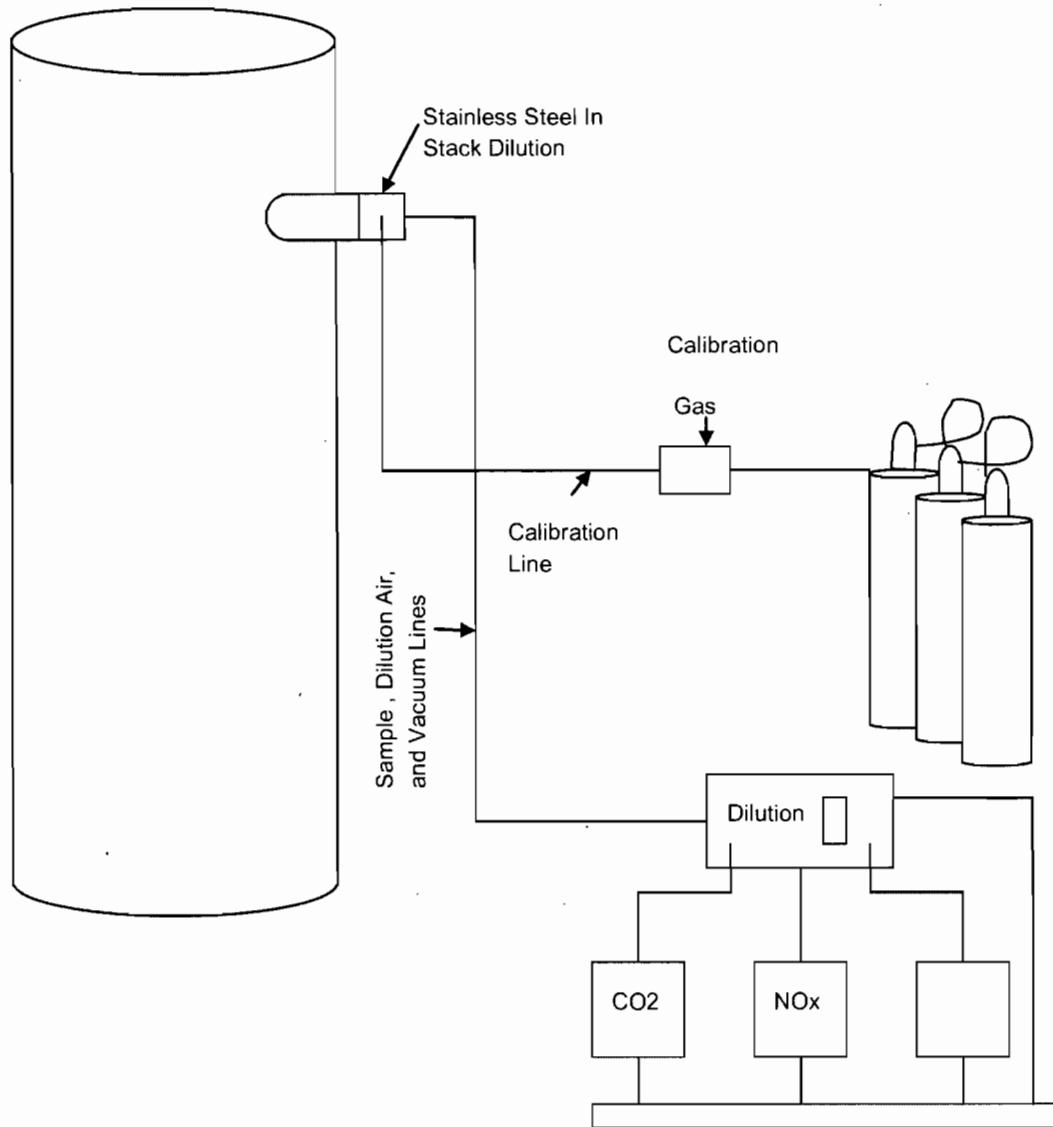
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Hopkins Unit 1

VI. TCEMS Gas Sample Train Schematics

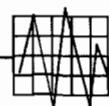


APPENDIX A

EPA Detailed Monitoring Report

ECMPS

(Includes Relative Accuracy Summaries)



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1



ECMPS Client Tool

Version 1.0 2012 Q2

QA/Cert Test Detail Report

July 26, 2012 02:20 PM

Facility Name: Arvah B Hopkins

Facility Details

Facility ID (ORISPL): 688

State: FL

County: Leon

Unit/Stack/Pipe ID: 1

Relative Accuracy Test

System ID: 104 System Parameter: NOX
Test Number: 01-104-20120711 Reason for Test: QA
of Op. Levels: 1 Grace Period Test?

Test Completion: 07/11/2012 13:33
Reported Test Results: PASSED
EPA Calculated Result: PASSED

Evaluation Status: No Errors
Submission Status: Not Submitted
Submission Date:

Reported BAF: 1.000
EPA Calculated BAF: 1.000
RATA Frequency: 4QTRS

Air Emissions Testing Data

QI Name: Garrett, James L
Exam Date: 02/17/2011
Provider Name: Source Evaluation Society
Provider Email: qstiprogram@gmail.com

AETB Name: Spectrum Systems, Inc.
AETB Phone Number: 800-432-6119
AETB Email: jimmy@spectrumsystems.com

Protocol Gas Data:

Gas Level Code	Gas Type Code	Vendor Identifier	Cylinder Identifier	Expiration Date
High	NC2	A12011	ALM026383	12/18/2013
Mid	NC2	A12011	ALM020362	12/18/2013
Low	ZERO			

Operating Level: Low
Reference Method Used: 7E,3A: NOX RM 7E and CO2/O2 RM 3A
Summary Statistics:

	Reported	Recalculated		Reported	Recalculated

Facility Name: Arvah B Hopkins
Facility ID (ORISPL): 688

QA/Cert Test Detail Report
July 26, 2012 02:20 PM

Mean of Monitoring System	0.147	0.147	Relative Accuracy	3.70	3.70
Mean of Reference Method Values	0.144	0.144	Bias Adjustment Factor	1.000	1.000
Mean of Difference	-0.003	-0.003	APS Indicator		
Standard Deviation of Difference	0.003	0.003	T-Value	2.306	2.306
Confidence Coefficient	0.002	0.002	Gross Unit Load or Velocity	30	30

Run Data:

Run	Start Date	End Date	Run Status	Monitoring System Value	Reference Method Value	Gross Load or Velocity
1	07/11/2012 08:37	07/11/2012 08:58	RUNUSED	0.145	0.144	30
2	07/11/2012 09:10	07/11/2012 09:31	RUNUSED	0.146	0.142	30
3	07/11/2012 09:44	07/11/2012 10:05	RUNUSED	0.143	0.142	30
4	07/11/2012 10:19	07/11/2012 10:40	RUNUSED	0.145	0.141	30
5	07/11/2012 10:52	07/11/2012 11:13	RUNUSED	0.148	0.143	30
6	07/11/2012 11:28	07/11/2012 11:49	RUNUSED	0.149	0.140	30
7	07/11/2012 12:01	07/11/2012 12:22	RUNUSED	0.150	0.150	30
8	07/11/2012 12:39	07/11/2012 13:00	RUNUSED	0.148	0.146	30
9	07/11/2012 13:12	07/11/2012 13:33	RUNUSED	0.148	0.145	30

Additional Information:

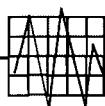
No comment.

*Performance Spec: RA <= 10% or Mean Difference <= +/- 2.0fps;

Reduced Frequency Spec: RA <= 7.5% or Mean Difference +/- 1.5 fps (Appendix A &3.3.4)

APPENDIX B

Gas Relative Accuracy Reference Method Data



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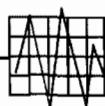
Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Appendix B, Section 1

Gas Sampling Bias and Drift Results



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 1
Start Time: 8:37:00
Stop Time: 8:58:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.07	0.00	0.15	0.00	-0.03%
MID	126.96	126.96	0.00	125.86	0.00	0.40%
CO2						
ZERO	0.01	0.01	0.00	-0.08	-0.01	0.80%
MID	5.12	5.12	0.00	4.97	-0.01	1.43%

Sampling System Bias and Drift

Performed By: **Spectrum Systems** Date Performed: 11-Jul-2012
Pensacola, Florida Test Number: 1

Performed For: **City of Tallahassee** Run Number: 2
Hopkins, Unit 1 Start Time: 9:10:00
Tallahassee, Florida Stop Time: 9:31:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.15	0.00	0.59	0.00	-0.16%
MID	126.96	125.86	0.00	126.45	0.00	-0.21%
CO2						
ZERO	0.01	-0.08	-0.01	0.14	0.01	-1.96%
MID	5.12	4.97	-0.01	5.13	0.00	-1.47%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 3
Start Time: 9:44:00
Stop Time: 10:05:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.59	0.00	0.81	0.00	-0.08%
MID	126.96	126.45	0.00	125.86	0.00	0.21%
CO2						
ZERO	0.01	0.14	0.01	0.02	0.00	1.03%
MID	5.12	5.13	0.00	4.97	-0.01	1.43%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 4
Tallahassee, Florida Start Time: 10:19:00
Stop Time: 10:40:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.81	0.00	0.37	0.00	0.16%
MID	126.96	125.86	0.00	125.13	-0.01	0.27%
CO2						
ZERO	0.01	0.02	0.00	0.22	0.02	-1.83%
MID	5.12	4.97	-0.01	5.02	-0.01	-0.45%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 5
Tallahassee, Florida Start Time: 10:52:00
Stop Time: 11:13:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.37	0.00	0.59	0.00	-0.08%
MID	126.96	125.13	-0.01	127.25	0.00	-0.77%
CO2						
ZERO	0.01	0.22	0.02	0.15	0.01	0.71%
MID	5.12	5.02	-0.01	5.05	-0.01	-0.22%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 6
Start Time: 11:28:00
Stop Time: 11:49:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.59	0.00	0.37	0.00	0.08%
MID	126.96	127.25	0.00	130.26	0.01	-1.09%
CO2						
ZERO	0.01	0.15	0.01	0.21	0.02	-0.63%
MID	5.12	5.05	-0.01	5.12	0.00	-0.71%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 7
Start Time: 12:01:00
Stop Time: 12:22:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.37	0.00	0.44	0.00	-0.03%
MID	126.96	130.26	0.01	127.25	0.00	1.09%
CO2						
ZERO	0.01	0.21	0.02	0.14	0.01	0.67%
MID	5.12	5.12	0.00	5.19	0.01	-0.63%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 8
Start Time: 12:39:00
Stop Time: 13:00:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.44	0.00	0.44	0.00	0.00%
MID	126.96	127.25	0.00	127.18	0.00	0.03%
CO2						
ZERO	0.01	0.14	0.01	0.14	0.01	0.00%
MID	5.12	5.19	0.01	5.06	-0.01	1.16%

Sampling System Bias and Drift

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

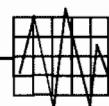
Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 9
Start Time: 13:12:00
Stop Time: 13:33:00

Monitor Type	Analyzer Cal Response	Initial Cal Value	Calculated Bias	Final Cal Value	Calculated Bias	Calculated Drift
NOx						
ZERO	0.07	0.44	0.00	0.37	0.00	0.03%
MID	126.96	127.18	0.00	127.18	0.00	0.00%
CO2						
ZERO	0.01	0.14	0.01	0.18	0.02	-0.36%
MID	5.12	5.06	-0.01	5.12	0.00	-0.49%

Appendix B, Section 2

Gas Run Average Emission Calculations



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 1
Tallahassee, Florida Start Time: 8:37:00
Stop Time: 8:58:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.07	0.15
MID	126.40 ppm	126.96	126.41
CO2			
ZERO	0.00 percent	0.01	-0.08
MID	4.96 percent	5.12	4.97
			5.05

Mean Reference Values:

74.67 ppm NOx

6.58 percent CO2

Corrected Results:

74.62 ppm NOx

6.45 percent CO2

Emission Calculations

0.144 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 2
Tallahassee, Florida Start Time: 9:10:00
Stop Time: 9:31:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.15	0.59
MID	126.40 ppm	125.86	126.45
CO2			
ZERO	0.00 percent	-0.08	0.14
MID	4.96 percent	4.97	5.13

Mean Reference Values:

74.37 ppm NOx
6.62 percent CO2

Corrected Results:

74.36 ppm NOx
6.51 percent CO2

Emission Calculations

0.142 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 3
Tallahassee, Florida Start Time: 9:44:00
Stop Time: 10:05:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.59	0.81
MID	126.40 ppm	126.45	125.86
CO2			
ZERO	0.00 percent	0.14	0.02
MID	4.96 percent	5.13	4.97

Mean Reference Values:

75.07 ppm NOx
6.64 percent CO2

Corrected Results:

74.93 ppm NOx
6.55 percent CO2

Emission Calculations

0.142 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida

Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1
Tallahassee, Florida

Run Number: 4
Start Time: 10:19:00
Stop Time: 10:40:00

Calibration Gas Value		Initial Calibration	Final Calibration	Average
NOx				
ZERO	0.00 ppm	0.81	0.37	0.59
MID	126.40 ppm	125.86	125.13	125.49
CO2				
ZERO	0.00 percent	0.02	0.22	0.12
MID	4.96 percent	4.97	5.02	5.00

Mean Reference Values:

75.76 ppm NOx
6.69 percent CO2

Corrected Results:

76.07 ppm NOx
6.68 percent CO2

Emission Calculations

0.141 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 5
Tallahassee, Florida Start Time: 10:52:00
Stop Time: 11:13:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.37	0.59
MID	126.40 ppm	125.13	127.25
			126.19
CO2			
ZERO	0.00 percent	0.22	0.15
MID	4.96 percent	5.02	5.05
			5.03

Mean Reference Values:

77.00 ppm NOx
6.73 percent CO2

Corrected Results:

76.94 ppm NOx
6.70 percent CO2

Emission Calculations

0.143 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By:	Spectrum Systems Pensacola, Florida	Date Performed:	11-Jul-2012
		Test Number:	1
Performed For:	City of Tallahassee Hopkins, Unit 1 Tallahassee, Florida	Run Number:	6
		Start Time:	11:28:00
		Stop Time:	11:49:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.59	0.37
MID	126.40 ppm	127.25	128.75
CO2			
ZERO	0.00 percent	0.15	0.21
MID	4.96 percent	5.05	5.12

Mean Reference Values:

76.17 ppm NOx

6.72 percent CO₂

Corrected Results:

74.59 ppm NOx

6.62 percent CO₂

Emission Calculations

0.140 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By:	Spectrum Systems Pensacola, Florida	Date Performed:	11-Jul-2012
		Test Number:	1
Performed For:	City of Tallahassee Hopkins, Unit 1 Tallahassee, Florida	Run Number:	7
		Start Time:	12:01:00
		Stop Time:	12:22:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.37	0.44
MID	126.40 ppm	130.26	128.75
CO2			
ZERO	0.00 percent	0.21	0.14
MID	4.96 percent	5.12	5.19

Mean Reference Values:

80.02 ppm NOx
6.72 percent CO2

Corrected Results:

78.41 ppm NOx
6.51 percent CO2

Emission Calculations

0.150 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By:	Spectrum Systems Pensacola, Florida	Date Performed:	11-Jul-2012
		Test Number:	1
Performed For:	City of Tallahassee Hopkins, Unit 1 Tallahassee, Florida	Run Number:	8
		Start Time:	12:39:00
		Stop Time:	13:00:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.44	0.44
MID	126.40 ppm	127.25	127.18
CO2			
ZERO	0.00 percent	0.14	0.14
MID	4.96 percent	5.19	5.06

Mean Reference Values:

77.09 ppm NOx
6.66 percent CO2

Corrected Results:

76.42 ppm NOx
6.48 percent CO2

Emission Calculations

0.146 lbs/mmBtu NOx

Calculation of Average Emissions

Performed By: **Spectrum Systems**
Pensacola, Florida Date Performed: 11-Jul-2012
Test Number: 1

Performed For: **City of Tallahassee**
Hopkins, Unit 1 Run Number: 9
Tallahassee, Florida Start Time: 13:12:00
Stop Time: 13:33:00

Calibration Gas Value	Initial Calibration	Final Calibration	Average
NOx			
ZERO	0.00 ppm	0.44	0.37
MID	126.40 ppm	127.18	127.18
CO2			
ZERO	0.00 percent	0.14	0.18
MID	4.96 percent	5.06	5.12

Mean Reference Values:

76.85 ppm NOx

6.63 percent CO2

Corrected Results:

76.22 ppm NOx

6.51 percent CO2

Emission Calculations

0.145 lbs/mmBtu NOx

Appendix B, Section 3

Gas Calibration Raw Data



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

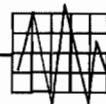
Hopkins Unit 1

Date/Time	Cylinder	Analyzer	Gas	Class	Type	Value	Expected	Status
7/11/2012 7:57	Dilution Air	CO2/A	CO2	BOTH	ZERO	0.117	0.000	PASS
7/11/2012 7:57	Dilution Air	NOx/A	NOx	BOTH	ZERO	0.147	0.000	PASS
7/11/2012 8:21	Dilution Air	CO2/A	CO2	BOTH	ZERO	0.010	0.000	PASS
7/11/2012 8:21	Dilution Air	NOx/A	NOx	BOTH	ZERO	0.073	0.000	PASS
7/11/2012 8:27	ALM026383	CO2/A	CO2	BOTH	HIGH	10.984	10.940	PASS
7/11/2012 8:27	ALM026383	NOx/A	NOx	BOTH	HIGH	272.308	276.000	PASS
7/11/2012 8:31	ALM020362	CO2/A	CO2	BOTH	MID	5.123	4.960	PASS
7/11/2012 8:31	ALM020362	NOx/A	NOx	BOTH	MID	126.960	126.400	PASS
7/11/2012 9:00	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	-0.078	0.000	PASS
7/11/2012 9:00	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.147	0.000	PASS
7/11/2012 9:03	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	4.967	4.960	PASS
7/11/2012 9:03	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	125.861	126.400	PASS
7/11/2012 9:33	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.137	0.000	PASS
7/11/2012 9:33	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.586	0.000	PASS
7/11/2012 9:37	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.128	4.960	PASS
7/11/2012 9:37	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	126.447	126.400	PASS
7/11/2012 10:07	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.024	0.000	PASS
7/11/2012 10:07	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.806	0.000	PASS
7/11/2012 10:11	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	4.972	4.960	PASS
7/11/2012 10:11	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	125.861	126.400	PASS
7/11/2012 10:42	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.225	0.000	PASS
7/11/2012 10:42	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.366	0.000	PASS
7/11/2012 10:46	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.021	4.960	PASS
7/11/2012 10:46	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	125.128	126.400	PASS
7/11/2012 11:15	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.147	0.000	PASS
7/11/2012 11:15	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.586	0.000	PASS
7/11/2012 11:18	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.045	4.960	PASS
7/11/2012 11:18	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	127.253	126.400	PASS
7/11/2012 11:51	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.215	0.000	PASS
7/11/2012 11:51	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.366	0.000	PASS
7/11/2012 11:55	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.123	4.960	PASS
7/11/2012 11:55	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	130.256	126.400	PASS
7/11/2012 12:24	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.142	0.000	PASS
7/11/2012 12:24	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.440	0.000	PASS
7/11/2012 12:33	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.192	4.960	PASS
7/11/2012 12:33	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	127.253	126.400	PASS
7/11/2012 13:02	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.142	0.000	PASS
7/11/2012 13:02	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.440	0.000	PASS
7/11/2012 13:05	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.065	4.960	PASS
7/11/2012 13:05	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	127.179	126.400	PASS
7/11/2012 13:35	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.181	0.000	PASS
7/11/2012 13:35	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.366	0.000	PASS
7/11/2012 13:39	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.118	4.960	PASS
7/11/2012 13:39	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	127.179	126.400	PASS
7/11/2012 13:53	ALM064109	NOx/A	NOx	Nox Converter	MID	44.288	46.600	PASS

Reference Method
 Calibration Data
 Hopkins, Unit 1

Appendix B, Section 4

Gas Minute and Run Averages Raw Data



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Run #1

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 8:37	6.501	76.129
2	7/11/2012 8:38	6.466	75.946
3	7/11/2012 8:39	6.540	75.739
4	7/11/2012 8:40	6.567	75.531
5	7/11/2012 8:41	6.580	75.299
6	7/11/2012 8:42	6.516	74.982
7	7/11/2012 8:43	6.586	74.518
8	7/11/2012 8:44	6.568	75.031
9	7/11/2012 8:45	6.514	75.177
10	7/11/2012 8:46	6.620	74.847
11	7/11/2012 8:47	6.594	74.799
12	7/11/2012 8:48	6.564	74.347
13	7/11/2012 8:49	6.564	74.652
14	7/11/2012 8:50	6.647	73.907
15	7/11/2012 8:51	6.632	74.261
16	7/11/2012 8:52	6.663	73.871
17	7/11/2012 8:53	6.616	73.822
18	7/11/2012 8:54	6.602	73.529
19	7/11/2012 8:55	6.623	73.907
20	7/11/2012 8:56	6.597	73.810
21	7/11/2012 8:57	6.554	73.956
Average		6.577	74.669

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #2

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 9:10	6.553	75.067
2	7/11/2012 9:11	6.640	74.506
3	7/11/2012 9:12	6.621	74.969
4	7/11/2012 9:13	6.539	74.335
5	7/11/2012 9:14	6.608	74.310
6	7/11/2012 9:15	6.606	74.225
7	7/11/2012 9:16	6.632	74.554
8	7/11/2012 9:17	6.592	74.542
9	7/11/2012 9:18	6.632	74.225
10	7/11/2012 9:19	6.700	74.591
11	7/11/2012 9:20	6.652	74.176
12	7/11/2012 9:21	6.607	74.310
13	7/11/2012 9:22	6.645	74.664
14	7/11/2012 9:23	6.632	74.554
15	7/11/2012 9:24	6.638	73.773
16	7/11/2012 9:25	6.696	74.042
17	7/11/2012 9:26	6.600	74.115
18	7/11/2012 9:27	6.623	74.420
19	7/11/2012 9:28	6.578	74.457
20	7/11/2012 9:29	6.596	73.761
21	7/11/2012 9:30	6.618	74.225
Average		6.619	74.372

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #3

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 9:44	6.596	75.104
2	7/11/2012 9:45	6.588	74.774
3	7/11/2012 9:46	6.635	74.908
4	7/11/2012 9:47	6.578	75.263
5	7/11/2012 9:48	6.628	75.751
6	7/11/2012 9:49	6.552	75.543
7	7/11/2012 9:50	6.637	74.896
8	7/11/2012 9:51	6.602	75.397
9	7/11/2012 9:52	6.686	75.153
10	7/11/2012 9:53	6.559	75.360
11	7/11/2012 9:54	6.711	75.665
12	7/11/2012 9:55	6.701	75.116
13	7/11/2012 9:56	6.685	75.165
14	7/11/2012 9:57	6.605	75.214
15	7/11/2012 9:58	6.693	75.201
16	7/11/2012 9:59	6.669	75.507
17	7/11/2012 10:00	6.626	75.348
18	7/11/2012 10:01	6.674	74.640
19	7/11/2012 10:02	6.702	74.615
20	7/11/2012 10:03	6.701	73.919
21	7/11/2012 10:04	6.697	73.907
Average		6.644	75.069

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #4

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 10:19	6.606	76.581
2	7/11/2012 10:20	6.641	76.581
3	7/11/2012 10:21	6.641	76.252
4	7/11/2012 10:22	6.637	75.495
5	7/11/2012 10:23	6.572	75.495
6	7/11/2012 10:24	6.685	76.081
7	7/11/2012 10:25	6.709	76.459
8	7/11/2012 10:26	6.711	76.252
9	7/11/2012 10:27	6.661	75.971
10	7/11/2012 10:28	6.701	76.020
11	7/11/2012 10:29	6.723	75.946
12	7/11/2012 10:30	6.718	75.604
13	7/11/2012 10:31	6.700	75.495
14	7/11/2012 10:32	6.776	75.385
15	7/11/2012 10:33	6.661	75.360
16	7/11/2012 10:34	6.701	75.311
17	7/11/2012 10:35	6.707	75.641
18	7/11/2012 10:36	6.709	75.482
19	7/11/2012 10:37	6.763	75.287
20	7/11/2012 10:38	6.724	75.140
21	7/11/2012 10:39	6.702	75.226
Average		6.688	75.765

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #5

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 10:52	6.704	77.131
2	7/11/2012 10:53	6.694	77.179
3	7/11/2012 10:54	6.717	77.033
4	7/11/2012 10:55	6.687	77.314
5	7/11/2012 10:56	6.766	76.874
6	7/11/2012 10:57	6.670	77.070
7	7/11/2012 10:58	6.689	77.106
8	7/11/2012 10:59	6.756	76.459
9	7/11/2012 11:00	6.731	76.606
10	7/11/2012 11:01	6.786	76.569
11	7/11/2012 11:02	6.729	76.300
12	7/11/2012 11:03	6.757	76.520
13	7/11/2012 11:04	6.663	76.850
14	7/11/2012 11:05	6.758	77.070
15	7/11/2012 11:06	6.739	77.314
16	7/11/2012 11:07	6.733	77.436
17	7/11/2012 11:08	6.729	77.399
18	7/11/2012 11:09	6.746	77.595
19	7/11/2012 11:10	6.723	77.497
20	7/11/2012 11:11	6.727	77.277
21	7/11/2012 11:12	6.768	76.447
Average		6.727	77.002

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #6

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 11:28	6.703	74.457
2	7/11/2012 11:29	6.668	74.164
3	7/11/2012 11:30	6.710	75.201
4	7/11/2012 11:31	6.707	75.727
5	7/11/2012 11:32	6.707	76.520
6	7/11/2012 11:33	6.716	76.752
7	7/11/2012 11:34	6.698	76.252
8	7/11/2012 11:35	6.716	76.068
9	7/11/2012 11:36	6.670	76.044
10	7/11/2012 11:37	6.716	76.337
11	7/11/2012 11:38	6.722	76.398
12	7/11/2012 11:39	6.758	75.885
13	7/11/2012 11:40	6.761	76.032
14	7/11/2012 11:41	6.698	76.422
15	7/11/2012 11:42	6.712	76.129
16	7/11/2012 11:43	6.729	76.398
17	7/11/2012 11:44	6.728	76.752
18	7/11/2012 11:45	6.735	76.838
19	7/11/2012 11:46	6.773	76.569
20	7/11/2012 11:47	6.783	77.216
21	7/11/2012 11:48	6.702	77.509
Average		6.720	76.175

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #7

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 12:01	6.722	79.805
2	7/11/2012 12:02	6.727	79.658
3	7/11/2012 12:03	6.674	80.330
4	7/11/2012 12:04	6.716	80.305
5	7/11/2012 12:05	6.737	80.049
6	7/11/2012 12:06	6.746	79.707
7	7/11/2012 12:07	6.655	79.902
8	7/11/2012 12:08	6.741	80.171
9	7/11/2012 12:09	6.706	80.379
10	7/11/2012 12:10	6.768	80.000
11	7/11/2012 12:11	6.704	79.902
12	7/11/2012 12:12	6.755	80.049
13	7/11/2012 12:13	6.698	79.866
14	7/11/2012 12:14	6.710	80.012
15	7/11/2012 12:15	6.769	80.293
16	7/11/2012 12:16	6.729	80.342
17	7/11/2012 12:17	6.742	80.085
18	7/11/2012 12:18	6.669	80.061
19	7/11/2012 12:19	6.751	79.780
20	7/11/2012 12:20	6.757	79.683
21	7/11/2012 12:21	6.729	80.049
Average		6.724	80.020

Reference Method
One Minute Averages
Hopkins, Unit 1

Run #8

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 12:39	6.698	77.924
2	7/11/2012 12:40	6.655	77.631
3	7/11/2012 12:41	6.601	77.595
4	7/11/2012 12:42	6.649	77.509
5	7/11/2012 12:43	6.612	77.375
6	7/11/2012 12:44	6.663	77.253
7	7/11/2012 12:45	6.701	76.813
8	7/11/2012 12:46	6.729	76.972
9	7/11/2012 12:47	6.681	77.253
10	7/11/2012 12:48	6.676	76.569
11	7/11/2012 12:49	6.633	76.752
12	7/11/2012 12:50	6.628	76.447
13	7/11/2012 12:51	6.672	76.777
14	7/11/2012 12:52	6.667	76.972
15	7/11/2012 12:53	6.678	76.496
16	7/11/2012 12:54	6.631	77.106
17	7/11/2012 12:55	6.698	77.204
18	7/11/2012 12:56	6.694	77.021
19	7/11/2012 12:57	6.696	76.899
20	7/11/2012 12:58	6.628	77.106
21	7/11/2012 12:59	6.616	77.179
Average		6.662	77.088

Reference Method
One Minute Averages
Hopkins, Unit 1

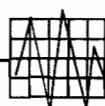
Run #9

#	Date/Time	CO2/A	NOx/A
1	7/11/2012 13:12	6.630	77.534
2	7/11/2012 13:13	6.615	77.302
3	7/11/2012 13:14	6.637	77.375
4	7/11/2012 13:15	6.639	77.118
5	7/11/2012 13:16	6.636	77.228
6	7/11/2012 13:17	6.594	76.972
7	7/11/2012 13:18	6.660	76.838
8	7/11/2012 13:19	6.652	76.789
9	7/11/2012 13:20	6.646	77.021
10	7/11/2012 13:21	6.672	76.911
11	7/11/2012 13:22	6.589	76.740
12	7/11/2012 13:23	6.599	76.679
13	7/11/2012 13:24	6.554	77.411
14	7/11/2012 13:25	6.667	76.911
15	7/11/2012 13:26	6.651	76.593
16	7/11/2012 13:27	6.575	76.948
17	7/11/2012 13:28	6.623	76.825
18	7/11/2012 13:29	6.624	76.471
19	7/11/2012 13:30	6.621	76.142
20	7/11/2012 13:31	6.664	76.032
21	7/11/2012 13:32	6.611	76.044
Average		6.627	76.852

Reference Method
One Minute Averages
Hopkins, Unit 1

APPENDIX C

Plant CEMS Data



Spectrum Systems, Inc.

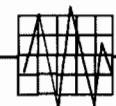
Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Appendix C Section 1

CEMS Gas Data



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

DATE	TIME	CO2 (%)	GAS FLOW (100scfh)	GENERATION (MW)	NOx (PPM)	NOx RATE (lbs/MMBtu)
07/11/12	083800	6.4	3375.65	30.28	74.41	0.145
07/11/12	083900	6.42	3366.66	30.27	74.41	0.144
07/11/12	084000	6.41	3391.56	30.3	76.55	0.148
07/11/12	084100	6.41	3383.26	30.12	76.13	0.148
07/11/12	084200	6.44	3387.06	30.23	76.31	0.147
07/11/12	084300	6.43	3400.9	30.45	76.15	0.147
07/11/12	084400	6.45	3374.61	30.15	74.25	0.143
07/11/12	084500	6.44	3363.55	30.15	74.83	0.144
07/11/12	084600	6.4	3379.11	30.19	75.12	0.146
07/11/12	084700	6.41	3390.18	30.18	74.9	0.145
07/11/12	084800	6.43	3373.23	30.27	74.71	0.145
07/11/12	084900	6.41	3371.5	30.2	74.62	0.144
07/11/12	085000	6.41	3398.83	30.34	74.85	0.145
07/11/12	085100	6.43	3371.15	30.17	74.04	0.144
07/11/12	085200	6.43	3382.22	30.26	74.43	0.144
07/11/12	085300	6.41	3382.22	30.22	74.44	0.144
07/11/12	085400	6.43	3378.07	30.18	74.89	0.144
07/11/12	085500	6.43	3389.49	30.33	74.52	0.144
07/11/12	085600	6.42	3386.03	30.38	74.5	0.144
07/11/12	085700	6.42	3381.88	30.31	74.56	0.144
07/11/12	085800	6.41	3391.56	30.1	75.17	0.145
AVG		6.421	3381.844	30	74.942	0.145
07/11/12	091100	6.38	3382.92	30.33	74.93	0.146
07/11/12	091200	6.4	3399.52	30.34	74.53	0.145
07/11/12	091300	6.42	3387.41	30.16	75.15	0.146
07/11/12	091400	6.42	3391.91	30.25	74.91	0.145
07/11/12	091500	6.4	3386.72	30.19	74.96	0.146
07/11/12	091600	6.39	3378.76	30.24	74.77	0.145
07/11/12	091700	6.4	3382.57	30.19	75.02	0.146
07/11/12	091800	6.4	3384.64	30.42	75.27	0.146
07/11/12	091900	6.41	3395.37	30.27	75.05	0.146
07/11/12	092000	6.43	3370.12	30.15	75.12	0.145
07/11/12	092100	6.41	3391.21	30.39	75.18	0.146
07/11/12	092200	6.4	3394.33	30.32	75.1	0.146
07/11/12	092300	6.43	3387.06	30.2	75.49	0.146
07/11/12	092400	6.42	3391.56	30.38	75.32	0.146
07/11/12	092500	6.41	3402.28	30.34	74.58	0.145
07/11/12	092600	6.42	3374.96	30.09	74.9	0.145
07/11/12	092700	6.41	3391.56	30.28	75.16	0.145
07/11/12	092800	6.39	3384.64	30.29	75.16	0.146
07/11/12	092900	6.39	3377.04	30.1	75.61	0.147
07/11/12	093000	6.41	3381.88	30.4	74.77	0.145
07/11/12	093100	6.4	3399.17	30.2	75.35	0.146
AVG		6.407	3387.411	30	75.063	0.146

CITY OF TALLAHASSEE
 HOPKINS GENERATING STATION
 UNIT 1
 CEMS DATA

DATE	TIME	CO2 (%)	GAS FLOW (100scfh)	GENERATION (MW)	NOx (PPM)	NOx RATE (lbs/MMBtu)
07/11/12	094500	6.42	3393.64	30.28	73.04	0.141
07/11/12	094600	6.38	3393.64	30.1	72.69	0.141
07/11/12	094700	6.4	3377.38	30.31	73.23	0.142
07/11/12	094800	6.41	3380.84	30.24	73.23	0.142
07/11/12	094900	6.42	3386.03	30.26	73.35	0.142
07/11/12	095000	6.41	3393.98	30.22	73.93	0.143
07/11/12	095100	6.4	3378.77	30.28	72.91	0.142
07/11/12	095200	6.39	3388.79	30.21	73.78	0.144
07/11/12	095300	6.42	3370.81	30.04	73.33	0.142
07/11/12	095400	6.43	3372.54	30.17	73.74	0.143
07/11/12	095500	6.41	3383.26	30.34	74.1	0.143
07/11/12	095600	6.4	3398.13	30.29	73.55	0.143
07/11/12	095700	6.43	3383.6	30.31	73.56	0.142
07/11/12	095800	6.4	3401.59	30.22	73.84	0.143
07/11/12	095900	6.43	3383.6	30.18	73.65	0.143
07/11/12	100000	6.44	3376	30.08	74.12	0.143
07/11/12	100100	6.4	3380.15	30.3	73.94	0.144
07/11/12	100200	6.4	3409.2	30.32	74.17	0.144
07/11/12	100300	6.43	3388.79	30.33	74.02	0.143
07/11/12	100400	6.44	3394.68	30.21	73.56	0.142
07/11/12	100500	6.45	3368.39	30.12	73.63	0.142
AVG		6.415	3385.896	30	73.589	0.143
07/11/12	102000	6.43	3387.41	30.27	75.02	0.145
07/11/12	102100	6.43	3382.22	30.11	75.05	0.145
07/11/12	102200	6.42	3386.03	30.2	74.73	0.145
07/11/12	102300	6.43	3379.46	30.14	74.56	0.144
07/11/12	102400	6.44	3387.41	30.42	74.64	0.144
07/11/12	102500	6.42	3390.87	30.12	74.68	0.145
07/11/12	102600	6.44	3368.39	30.08	75.11	0.145
07/11/12	102700	6.43	3382.57	30.29	75.18	0.145
07/11/12	102800	6.38	3403.67	30.46	74.96	0.146
07/11/12	102900	6.41	3397.79	30.32	74.98	0.145
07/11/12	103000	6.43	3380.84	30.12	74.82	0.144
07/11/12	103100	6.43	3384.3	30.34	74.62	0.144
07/11/12	103200	6.42	3389.83	30.2	74.86	0.145
07/11/12	103300	6.42	3382.57	30.27	74.75	0.145
07/11/12	103400	6.42	3382.92	30.08	74.71	0.144
07/11/12	103500	6.43	3366.31	30.15	74.85	0.145
07/11/12	103600	6.4	3391.91	30.33	74.93	0.145
07/11/12	103700	6.39	3396.75	30.28	74.51	0.145
07/11/12	103800	6.43	3372.89	30.16	74.71	0.145
07/11/12	103900	6.44	3397.09	30.31	74.58	0.144
07/11/12	104000	6.41	3394.67	30.31	74.41	0.144
AVG		6.421	3385.995	30	74.793	0.145

CITY OF TALLAHASSEE
 HOPKINS GENERATING STATION
 UNIT 1
 CEMS DATA

DATE	TIME	CO2 (%)	GAS FLOW (100scfh)	GENERATION (MW)	NOx (PPM)	NOx RATE (lbs/MMBtu)
07/11/12	105300	6.49	3383.6	30.31	76.65	0.147
07/11/12	105400	6.51	3389.48	30.17	76.71	0.146
07/11/12	105500	6.49	3373.92	30.24	76.6	0.147
07/11/12	105600	6.49	3392.6	30.31	77.1	0.148
07/11/12	105700	6.49	3370.47	30.19	76.67	0.147
07/11/12	105800	6.51	3373.23	30.18	77.06	0.147
07/11/12	105900	6.47	3387.41	30.19	77.29	0.148
07/11/12	110000	6.49	3396.75	30.32	76.53	0.146
07/11/12	110100	6.5	3411.97	30.33	76.93	0.147
07/11/12	110200	6.51	3391.56	30.36	76.64	0.146
07/11/12	110300	6.52	3389.49	30.24	76.35	0.145
07/11/12	110400	6.53	3372.19	30.26	76.74	0.146
07/11/12	110500	6.5	3392.6	30.46	77.06	0.147
07/11/12	110600	6.49	3378.76	30.13	77.6	0.148
07/11/12	110700	6.51	3364.24	30.23	77.93	0.149
07/11/12	110800	6.48	3390.17	30.39	78.21	0.15
07/11/12	110900	6.5	3384.3	30.21	78.17	0.149
07/11/12	111000	6.5	3381.88	30.21	78.42	0.15
07/11/12	111100	6.5	3381.88	30.31	78.09	0.149
07/11/12	111200	6.5	3393.29	30.25	78.09	0.149
07/11/12	111300	6.51	3380.84	30.28	76.86	0.147
	AVG	6.500	3384.792	30	77.224	0.148
07/11/12	112900	6.46	3378.77	30.17	75.62	0.145
07/11/12	113000	6.47	3381.88	30.34	75.62	0.145
07/11/12	113100	6.47	3398.13	30.17	76.81	0.147
07/11/12	113200	6.5	3389.48	30.4	77.01	0.147
07/11/12	113300	6.49	3402.97	30.45	77.94	0.149
07/11/12	113400	6.49	3382.91	30.05	78.29	0.15
07/11/12	113500	6.49	3365.27	30.11	77.64	0.149
07/11/12	113600	6.46	3387.06	30.24	77.27	0.148
07/11/12	113700	6.46	3378.42	30.17	77.54	0.149
07/11/12	113800	6.47	3373.57	30.22	77.61	0.149
07/11/12	113900	6.47	3402.28	30.51	77.81	0.15
07/11/12	114000	6.47	3376.69	30.21	76.92	0.148
07/11/12	114100	6.49	3370.12	30.28	77.33	0.148
07/11/12	114200	6.46	3386.37	30.22	77.65	0.149
07/11/12	114300	6.45	3382.91	30.2	77.45	0.149
07/11/12	114400	6.48	3392.25	30.35	77.73	0.149
07/11/12	114500	6.47	3361.82	30.19	77.98	0.15
07/11/12	114600	6.47	3383.61	30.4	78.15	0.15
07/11/12	114700	6.46	3384.99	30.23	77.72	0.149
07/11/12	114800	6.48	3365.62	30.08	78.71	0.151
07/11/12	114900	6.49	3365.62	30.3	77.71	0.149
	AVG	6.474	3381.464	30	77.453	0.149

CITY OF TALLAHASSEE
HOPKINS GENERATING STATION
UNIT 1
CEMS DATA

DATE	TIME	CO2 (%)	GAS FLOW (100scfh)	GENERATION (MW)	NOx (PPM)	NOx RATE (lbs/MMBtu)
07/11/12	120200	6.52	3384.99	30.41	77.35	0.147
07/11/12	120300	6.51	3384.3	30.32	77.35	0.148
07/11/12	120400	6.48	3372.19	30.2	77.99	0.149
07/11/12	120500	6.48	3372.54	30.29	78.3	0.15
07/11/12	120600	6.48	3369.43	30.2	77.77	0.149
07/11/12	120700	6.51	3368.04	30.33	77.48	0.148
07/11/12	120800	6.49	3374.27	30.16	77.92	0.149
07/11/12	120900	6.46	3366.66	30.33	78.27	0.15
07/11/12	121000	6.45	3379.46	30.1	78.6	0.151
07/11/12	121100	6.5	3383.26	30.46	77.73	0.148
07/11/12	121200	6.48	3381.88	30.24	78.18	0.15
07/11/12	121300	6.5	3356.97	30.15	78.49	0.15
07/11/12	121400	6.47	3380.15	30.28	77.97	0.15
07/11/12	121500	6.45	3366.31	30.28	78.31	0.151
07/11/12	121600	6.48	3350.4	30.2	78.71	0.151
07/11/12	121700	6.47	3390.87	30.43	78.78	0.151
07/11/12	121800	6.48	3368.04	30.11	78.56	0.15
07/11/12	121900	6.5	3375.65	30.43	78.46	0.15
07/11/12	122000	6.47	3372.54	30.28	78.13	0.15
07/11/12	122100	6.5	3354.21	30.11	78.09	0.149
07/11/12	122200	6.47	3386.03	30.45	78.55	0.151
AVG		6.483	3373.247	30	78.142	0.150
07/11/12	124000	6.49	3354.55	30.11	77.11	0.148
07/11/12	124100	6.47	3359.05	30.26	77.12	0.148
07/11/12	124200	6.47	3372.19	30.28	77.7	0.149
07/11/12	124300	6.47	3369.77	30.21	77.34	0.149
07/11/12	124400	6.47	3377.38	30.37	77.65	0.149
07/11/12	124500	6.49	3367.7	30.5	77.48	0.149
07/11/12	124600	6.47	3384.64	30.3	77.11	0.148
07/11/12	124700	6.48	3366.31	30.24	77.11	0.148
07/11/12	124800	6.48	3367.35	30.11	77.49	0.148
07/11/12	124900	6.48	3358.71	30.3	76.65	0.146
07/11/12	125000	6.47	3349.71	30.13	77.26	0.148
07/11/12	125100	6.47	3362.51	30.3	76.99	0.147
07/11/12	125200	6.46	3373.23	30.35	77.21	0.148
07/11/12	125300	6.45	3376.34	30.12	77.68	0.149
07/11/12	125400	6.47	3369.77	30.31	77.07	0.148
07/11/12	125500	6.48	3374.61	30.19	77.76	0.149
07/11/12	125600	6.47	3363.2	30.26	77.9	0.149
07/11/12	125700	6.47	3383.26	30.25	77.62	0.15
07/11/12	125800	6.48	3366.66	30.29	77.27	0.148
07/11/12	125900	6.48	3341.75	29.94	77.64	0.148
07/11/12	130000	6.45	3358.01	30.22	77.85	0.15
AVG		6.472	3366.510	30	77.381	0.148

CITY OF TALLAHASSEE
 HOPKINS GENERATING STATION
 UNIT 1
 CEMS DATA

DATE	TIME	CO2 (%)	GAS FLOW (100scfh)	GENERATION (MW)	NOx (PPM)	NOx RATE (lbs/MMBtu)
07/11/12	131300	6.46	3362.86	30.18	76.68	0.148
07/11/12	131400	6.47	3360.78	30.07	76.54	0.147
07/11/12	131500	6.46	3367.7	30.27	76.63	0.147
07/11/12	131600	6.46	3374.61	30.3	76.67	0.147
07/11/12	131700	6.47	3378.76	30.35	76.88	0.148
07/11/12	131800	6.47	3375.31	30.33	76.77	0.148
07/11/12	131900	6.49	3376.69	30.31	76.84	0.147
07/11/12	132000	6.48	3382.57	30.32	76.84	0.148
07/11/12	132100	6.48	3355.59	30.17	77.2	0.148
07/11/12	132200	6.49	3368.39	30.15	76.81	0.147
07/11/12	132300	6.46	3359.4	30.13	77.03	0.148
07/11/12	132400	6.47	3374.61	30.43	76.76	0.147
07/11/12	132500	6.45	3381.88	30.48	77.62	0.149
07/11/12	132600	6.48	3368.73	30.16	77.15	0.148
07/11/12	132700	6.49	3361.82	30.26	76.61	0.147
07/11/12	132800	6.46	3365.27	30.27	77.15	0.148
07/11/12	132900	6.46	3366.31	30.33	76.96	0.148
07/11/12	133000	6.46	3367.7	30.11	77.11	0.148
07/11/12	133100	6.46	3368.73	30.33	76.77	0.148
07/11/12	133200	6.46	3368.74	30.28	76.51	0.147
07/11/12	133300	6.46	3388.45	30.36	76.55	0.147
	AVG	6.469	3370.233	30	76.861	0.148

CITY OF TALLAHASSEE
 HOPKINS GENERATING STATION
 UNIT 1
 CEMS DATA

APPENDIX D

Reference Method Quality Assurance Data



Spectrum Systems, Inc.

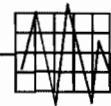
Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Appendix D Section 1

Gas Analyzer Calibration Error



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

Analyzer Calibration Error

Performed By:	Spectrum Systems Pensacola, Florida	Date Performed:	11-Jul-2012
		Test Number:	1
Performed For:	City of Tallahassee Hopkins, Unit 1 Tallahassee, Florida	Run Number:	1
		Start Time:	8:37:00
		Stop Time:	8:58:00

Nitrogen Oxides Monitor NOx/A

Span: 276

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference (ppm NOx)	Calibration Error
Dilution Air	0.00	0.07	-0.07	-0.03%
ALM020362	126.40	126.96	-0.56	-0.20%
ALM026383	276.00	272.31	3.69	1.34%

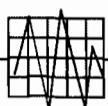
Carbon Dioxide Monitor CO2/A

Span: 11

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference (% CO2)	Calibration Error
Dilution Air	0.00	0.01	-0.01	-0.09%
ALM020362	4.96	5.12	-0.16	-1.49%
ALM026383	10.94	10.98	-0.04	-0.40%

Appendix D Section 2

Gas Interference Tests



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

To Whom It May Concern:

In an effort to assist our customers with the requirements of the Instrumental methods for testing, 3A, 6C, 7E, 10, and 20, we are providing a summary of interferences for certain Thermo Scientific analyzers.

The requirement for conducting analyzer interference checks for potential interfering gases is the responsibility of the testing organizations. The Methods do, however, allow the manufacturer of instruments to provide this data. Test are required to be conducted on the same "make and model" as those being used for method testing.

The information contained in the accompanying tables pertains to the "make" of analyzers under the names of; Thermo Electron Corporation, Thermo Environmental Instruments and Thermo Scientific. The "model" are models; Model 42 for NO, NO₂, NO_x, Model 43 for SO₂, and Model 410i for CO₂. The specific pollutant detection and analytical technology for each of the above listed specific models have remained the same for the various series of analyzers manufactured over the past years. Therefore, the interference test results shown for iSeries analyzers, would produce essentially the same results for C Series and earlier Series of these models.

The potential interference gases test results shown in the tables to follow indicate that none of Thermo Scientific analyzers tested have a collective analytical detection interference that would sum more than 0.06% of analyzer span value. The acceptance criterion is; the sum of the interference responses must not be greater than 2.5% of analyzer span value.

If you have any questions regarding the information contained herein please do no hesitate to contact us.

Thermo Fisher Scientific



Frank Duckett
Product Manager, Continuous Gas Analyzers
Air Quality Instruments

Thermo Scientific Model 42 NO-NO₂-NO_x Analyzer Potential Interference Gas Responses

Potential Interferent		Model 42iLS			Model 42iHL		
Test Gas	Concentration	NO	NO ₂	NO _x	NO	NO ₂	NO _x
CO ₂	5.20%	0.001	0.004	0.004	0.001	0.003	0.004
CO ₂	15.60%	0	0.003	0.003	0.001	0.004	0.005
H ₂ O	1.00%	0	0	0	0.003	0.001	0.004
NO	15 ppm	14.9	0.1	15	15	-0.06	14.99
NO ₂	15 ppm	1.1	14	15	0.4	14.6	15
N ₂ O	10 ppm	0	0	0	0	0	0
CO	50 ppm	0	0	0	0	0	0
SO ₂	21 ppm	-0.01	0	-0.01	0.007	0	0.007
CH ₄	50 ppm	0	0	0	0	0	0
HCl	10 ppm	0	0.006	0.006	0	0.004	0.004
NH ₃ ¹	10 ppm	0	0	0	0.17	8.9	9.1
Sum of Responses		0.011	0.01	0.02	0.011	0.009	0.02
Span Value		160	152	160	160	152	160
% of Calibration Span		0.01%	0.01%	0.01%	0.01%	0.01%	0.01%

Acceptance Criteria found in Section 13.4 of Method 7E is the sum of responses must not be greater than 2.5% of the analyzer calibration span value.

¹NH₃ interferent results shown for the Model 42iHL was not used in calculation of interference response check because it is a known interferent with an approximate 1 ppm to 1 ppm positive bias in analyzers using stainless steel NO₂ to NO converters. Thermo recommends that NO_x analyzers with stainless steel NO₂ to NO converters must use a NH₃ scrubber when testing sources with potential NH₃ in the flue gas.

This document is subject to change without notice.

Thermo Scientific Model 43 SO₂ and Model 410i CO₂ Analyzer Potential Interference Gas Responses

Potential Interferent		Model 43iHL	Model 410iHL
Test Gas	Concentration	SO ₂	CO ₂
CO ₂	5.20%	0.03	5.2
CO ₂	15.60%	0.14	15.6
H ₂ O	1.00%	-0.05	0
NO	15 ppm	0.2	0
NO ₂	15 ppm	0.06	0
N ₂ O	10 ppm	0	0
CO	50 ppm	0	0
SO ₂	21 ppm	21	0
CH ₄	50 ppm	0	0
HCl	10 ppm	0	0
NH ₃	10 ppm	0	0
Sum of Responses		0.45	0
Span Value		800	16
% of Calibration Span		0.06%	0%

Acceptance Criteria found in Section 13.4 of Method 7E is the sum of responses must not be greater than 2.5% of the analyzer calibration span value.

This document is subject to change without notice.

Carbon Dioxide Quality Assurance Interference Checks

Reference Method Analyzer CO2/A

Spectrum Systems, Incorporated

Test Location Spectrum Systems, Inc.
Date of Test 12/15/2006

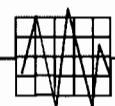
Analyzer Model Siemens Ultramat 6
Serial Number N1-T8-0416
Analyzer ID CO2/A

Analyzer Span 20

Test Gas Type	Concentration	Analyzer Response	% of Span
CO	483.00	0.01	0.05
SO2	253.20	0.01	0.05
NOX	197.80	0.02	0.10
O2	20.90	0.01	0.05
		Percent of Span Sum	0.25

Appendix D Section 3

NO_x Converter Efficiency Test



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

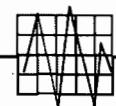
Hopkins Unit 1

Date/Time	Cylinder	Analyzer	Gas	Class	Type	Value	Expected	Status	NOx/A Monitor
7/11/2012 7:57	Dilution Air	CO2/A	CO2	BOTH	ZERO	0.117	0.000	PASS	TECO Model 42C
7/11/2012 7:57	Dilution Air	NOx/A	NOx	BOTH	ZERO	0.147	0.000	PASS	Spectrum Systems Trailer
7/11/2012 8:21	Dilution Air	CO2/A	CO2	BOTH	ZERO	0.010	0.000	PASS	
7/11/2012 8:21	Dilution Air	NOx/A	NOx	BOTH	ZERO	0.073	0.000	PASS	
7/11/2012 8:27	ALM026383	CO2/A	CO2	BOTH	HIGH	10.984	10.940	PASS	
7/11/2012 8:27	ALM026383	NOx/A	NOx	BOTH	HIGH	272.308	276.000	PASS	NOx/A Converter Efficiency = 95.04 %
7/11/2012 8:31	ALM020362	CO2/A	CO2	BOTH	MID	5.123	4.960	PASS	
7/11/2012 8:31	ALM020362	NOx/A	NOx	BOTH	MID	126.960	126.400	PASS	
7/11/2012 13:35	Dilution Air	CO2/A	CO2	BIAS AND DRIFT	ZERO	0.181	0.000	PASS	
7/11/2012 13:35	Dilution Air	NOx/A	NOx	BIAS AND DRIFT	ZERO	0.366	0.000	PASS	
7/11/2012 13:39	ALM020362	CO2/A	CO2	BIAS AND DRIFT	MID	5.118	4.960	PASS	
7/11/2012 13:39	ALM020362	NOx/A	NOx	BIAS AND DRIFT	MID	127.179	126.400	PASS	
7/11/2012 13:53	ALM064109	NOx/A	NOx	Nox Converter	MID	44.288	46.600	PASS	

Reference Method
 NOx Converter Efficiency
 Hopkins, Unit 1

Appendix D Section 4

Reference Method Response Test



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1

RESPONSE TIME TEST

Plant Hopkins

Unit 1

DATE: **11-Jul-12**

UPSCALE (minutes)

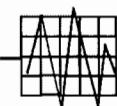
	TIME
CO2	2.30
NOX	2.10

DOWNSCALE (minutes)

	TIME
CO2	2.30
NOX	2.20

APPENDIX E

EPA Protocol I Gas Certificates



Spectrum Systems, Inc.

Annual RATA Testing, July 2012

City of Tallahassee

Hopkins Unit 1



Download as...

6141 EASTON ROAD, BLDG 1, PLUMSTEADVILLE, PA 18949-0310 Phone: 800-331-4953 Fax: 215-768-7226

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A12011
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC
 6141 EASTON ROAD, BLDG 1
 PLUMSTEADVILLE, PA 18949-0310

P.O. No.: 1101130F
 Document #: 44273710-001

Customer
 SPECTRUM SYSTEMS
 C/O CITY OF TALLAHASSEE
 3410 W NINE MILE ROAD
 PENSACOLA FL 32528
 US

ANALYTICAL INFORMATION Gas Type : NC2

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM020362
 Cylinder Pressure***: 1849 PSIG

Certification Date: 19Dec2011

Exp. Date: 18Dec2013
 Batch No: PLU0069991

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
NITRIC OXIDE	126.4 PPM	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	4.96 %	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE	BALANCE		
TOTAL OXIDES OF NITROGEN	127.2 PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1884	19May2018	KAL004374	98.91 PPM	NITRIC OXIDE
NTRM 2000	15Dec2011	K014221	4.954 %	CARBON DIOXIDE

INSTRUMENTATION

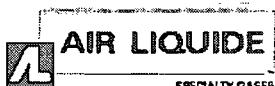
INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//000928781	29Nov2011	FTIR
FTIR//000828781	17Nov2011	FTIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)		
First Triad Analysis	Second Triad Analysis	Calibration Curve
NITRIC OXIDE Date: 12Dec2011 Response Unit: PPM $Z_1=-0.14407$ $R_1=86.95251$ $T_1=126.2412$ $Z_2=86.95977$ $Z_2=-0.21610$ $T_2=126.4419$ $Z_3=0.57072$ $T_3=126.5787$ $R_3=97.00008$ Avg. Concentration: 128.4 PPM	NITRIC OXIDE Date: 19Dec2011 Response Unit: PPM $Z_1=-0.34330$ $R_1=86.77036$ $T_1=126.3971$ $Z_2=98.81710$ $Z_2=-0.15839$ $T_2=126.4379$ $Z_3=-0.15891$ $T_3=126.5727$ $R_3=97.25481$ Avg. Concentration: 126.3 PPM	Concentration=A+Bx+Cx²+Dx³+Ex⁴ $r=9.99999E-1$ Constants: A=0.00000E+0 B=8.79948E-1 C=4.80000E-5 D=0.00000E+0 E=0.00000E+0
CARBON DIOXIDE Date: 12Dec2011 Response Unit: % $Z_1=0.00821$ $R_1=4.95379$ $T_1=4.96026$ $Z_2=4.95871$ $Z_2=-0.00427$ $T_2=4.96539$ $Z_3=0.00497$ $T_3=4.96791$ $R_3=4.96146$ Avg. Concentration: 4.961 %		Concentration=A+Bx+Cx²+Dx³+Ex⁴ $r=9.99998E-1$ Constants: A=0.00000E+0 B=8.11998E-1 C=1.18140E-2 D=0.00000E+0 E=0.00000E+0

QUALITY ASSURANCE

APPROVED BY: Michael A. Kuhns
 (signature on file)



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8141 EASTON ROAD, BLDG 1, PLUMSTEADVILLE, PA 18949-0310 Phone: 800-331-4953 Fax: 215-788-7226

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A12011
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC
 8141 EASTON ROAD, BLDG 1
 PLUMSTEADVILLE, PA 18949-0310

P.O. No.: 1101130F
 Document #: 44273710-002

Customer
SPECTRUM SYSTEMS
 C/O CITY OF TALLAHASSEE
 3410 W NINE MILE ROAD
 PENSACOLA FL 32526
 US

ANALYTICAL INFORMATION Gas Type : NC2

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM026383
 Cylinder Pressure***: 1925 PSIG

Certification Date: 19Dec2011

Exp. Date: 16Dec2013
 Batch No: PLU0069902

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
NITRIC OXIDE	276 PPM	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	10.94 %	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE	BALANCE		
TOTAL OXIDES OF NITROGEN	277. PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1885	01Jun2012	KALD04331	242.0 PPM	NITRIC OXIDE
NTRM 1875	15Dec2011	KD16692	13.94 %	CARBON DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//000928781	29Nov2011	FTIR
FTIR//000928781	17Nov2011	FTIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)		
First Triad Analysis	Second Triad Analysis	Calibration Curve
NITRIC OXIDE Date: 12Dec2011 Response Unit: PPM $Z_1=0.17747$ $R_1=241.4795$ $T_1=275.3856$ $R_2=241.6481$ $Z_2=0.03613$ $T_2=275.6505$ $Z_3=0.21910$ $T_3=278.0204$ $R_3=242.1503$ Avg. Concentration: 276.0 PPM	NITRIC OXIDE Date: 18Dec2011 Response Unit: PPM $Z_1=-0.29981$ $R_1=240.8302$ $T_1=275.0162$ $R_2=241.7289$ $Z_2=0.05872$ $T_2=275.0349$ $Z_3=0.16288$ $T_3=275.2240$ $R_3=242.0118$ Avg. Concentration: 275.6 PPM	Concentration=A+Bx+Cx²+Dx³+Ex⁴ $r=9.9999E-1$ Constants: A=0.00000E+0 $B=8.7564E-1$ $C=4.70000E-5$ $D=0.00000E+0$ $E=0.00000E+0$
CARBON DIOXIDE Date: 12Dec2011 Response Unit: % $Z_1=-0.00148$ $R_1=13.84446$ $T_1=10.86730$ $R_2=13.85741$ $Z_2=0.00320$ $T_2=10.88173$ $Z_3=0.00501$ $T_3=10.88458$ $R_3=13.87083$ Avg. Concentration: 10.94 %		Concentration=A+Bx+Cx²+Dx³+Ex⁴ $r=9.9999E-1$ Constants: A=0.00000E+0 $B=8.11998E-1$ $C=1.18140E-2$ $D=0.00000E+0$ $E=0.00000E+0$

QUALITY ASSURANCE

APPROVED BY: Michael A. Kuhns
 (signature on file)



6141 EASTON ROAD, BLDG 1, PLUMSTEADVILLE, PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A12012

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE, PA 18949-0310

P.O. No.: 1210408F
Document #: 45660738-001

Customer

SPECTRUM SYSTEMS
SEAN MYRICK/JIMMY
3410 WEST NINE MILE ROAD
PENSACOLA FL 32526
US

ANALYTICAL INFORMATION

Gas Type : NO₂

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM064109

Certification Date: 20Apr2012

Exp. Date: 19Oct2012

Cylinder Pressure***: 2000 PSIG

Batch No: PLU009365

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
NITROGEN DIOXIDE	46.6 PPM	+/- 2%	NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2660	02Oct2013	KAL003878	107.9 PPM	NITROGEN DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA220/5708850810	13Apr2012	CHEMILUMINESCENCE

QUALITY ASSURANCE

APPROVED BY: JOHN OSHEA

(signature on file)

END OF DOCUMENT