

Since 1908®

**EMISSIONS TESTING SERVICES**

EMISSIONS TEST REPORT  
FOR  
JACKSONVILLE ELECTRIC AUTHORITY  
AT  
ST. JOHNS RIVER POWER PARK  
UNITS 1 [REDACTED]  
October 18, 2000

CT&E Project No. 00-205MO



SINCE 1908®

# COMMERCIAL TESTING & ENGINEERING CO.

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October 31, 2000

I, Richard Howes, hereby certify the emissions tests conducted for Jacksonville Electric Authority at St. Johns River Power Park, Units #1 are in accordance with procedures established by the USEPA. This report accurately and faithfully presents the data obtained from the tests and the results determined from analysis of this data.

Richard Howes  
Midwest Region Manager

I, John Ellis, hereby attest that all work on this project was completed under my supervision and this report accurately presents the results of the emissions testing.

John Ellis  
Chief Test Engineer



Member of the SGS Group (Société Générale de Surveillance)

WITH LABORATORIES STRATEGICALLY LOCATED IN WELLINGTON, OH, HICKORY, NC, GRAIN VALLEY, MO, TAMPA, FL, AND DEER PARK, TX

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INTRODUCTION

## INTRODUCTION

This report presents the results of the emissions tests performed for Jacksonville Electric Authority at St. Johns River Power Park, Unit #1. The purpose of the tests was to determine the NO<sub>x</sub>/SO<sub>2</sub>/CO<sub>2</sub>/O<sub>2</sub> emissions of the unit. The results of the tests can be found in the Summary of Test Results section of this report.

Commercial Testing and Engineering, Midwest Division, whose office is located at 599 James Rollo Court, Grain Valley, Missouri 64029 performed the testing. The CT&E test crew consisted of Rick Howes, Dan Rigdon and Russ Arnott.

The tests were performed on October 18, 2000. The testing was performed in accordance with EPA reference methods as published in the July 1, 2000 Federal Register, "Standards of Performance for Stationary Sources and subsequent revisions.

The testing equipment and sampling procedures are described in the Sampling and Analytical Procedures section of this report. The raw field data and equations used in determining final results are presented in the Appendix section of this report.

SUMMARY OF TEST RESULTS

### SUMMARY OF TEST RESULTS

The following table presents the results of the emissions testing performed on October 18, 2000 for Jacksonville Electric Authority at St. Johns River Power Park, Unit #1.

#### GAS EMISSIONS

<u>Run #</u>	<u>Average of RATA Test Run #'s</u>	<u>NOx PPM</u>	<u>NOx Lb/mmBtu</u>	<u>SO2 PPM</u>	<u>SO2 Lb/mmBtu</u>	<u>CO2 %</u>	<u>O2 %</u>
1	1 - 3	289.233	0.456	208.773	0.457	13.647	5.743
2	4 - 6	299.733	0.474	209.517	0.461	13.590	5.817
3	7 - 9	<u>312.937</u>	<u>0.497</u>	<u>194.147</u>	<u>0.429</u>	<u>13.527</u>	<u>5.943</u>
Average		300.634	0.476	204.145	0.449	13.588	5.834

SI

The complete results can be found on the computer printouts following this page.



INTERMEDIATE CALCULATIONS

Commercial Testing and Engineering

Sampling System Bias Check and Measured Value Correction

JEA-SJRPP  
JACKSONVILLE, FL. - Unit 1  
Normal

Date: 10/18/00  
Pollutant: NOx  
Monitor Span: 1000

ICI

Run Number	Average Measured Value	Initial Zero Gas Bias	Final Zero Gas Bias	Zero Gas Drift	Initial Upscale Gas Bias	Final Upscale Gas Bias	Upscale Gas Drift	Calibration Gas PPM	Percent Moisture	Corrected Value, Dry Basis	Corrected Value, Wet Basis
1	286.35	0.10	0.10	0.00	557.00	558.00	0.10	558.00	10.24	286.56	257.22
2	284.59	0.10	0.30	0.02	558.00	557.00	-0.10	558.00	10.21	284.75	255.66
3	295.54	0.30	0.62	0.03	557.00	555.00	-0.20	558.00	11.23	296.39	263.11
4	304.07	0.62	0.36	-0.03	555.00	559.00	0.40	558.00	11.06	304.39	270.73
5	299.39	0.36	0.48	0.01	559.00	559.00	0.00	558.00	11.24	298.66	265.09
6	296.33	0.48	0.30	-0.02	559.00	557.00	-0.20	558.00	11.21	296.15	262.94
7	308.78	0.30	0.35	0.01	557.00	559.00	0.20	558.00	11.97	308.63	271.68
8	319.73	0.35	0.12	-0.02	559.00	558.00	-0.10	558.00	12.14	319.34	280.57
9	310.33	0.12	0.11	0.00	558.00	556.00	-0.20	558.00	11.27	310.84	275.81
10	303.70	0.11	0.41	0.03	556.00	556.00	0.00	558.00	11.51	304.67	269.60
11	302.39	0.41	0.10	-0.03	556.00	556.00	0.00	558.00	11.76	303.36	267.68
12	299.49	0.10	0.32	0.02	556.00	556.00	0.00	558.00	11.52	300.47	265.84

Avg dry

(1-3)  
289.233

(4-6)  
299.733

(7-9)  
312.937

Avg = 300.634

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \quad \text{Eq. 6C-1}$$

where:

- C<sub>gas</sub> = Effluent gas concentration, dry basis, ppm
- C<sub>avg</sub> = Average gas concentration indicated by gas analyzer, dry basis, ppm
- C<sub>o</sub> = Average of initial and final system calibration bias check responses for the zero gas, ppm
- C<sub>m</sub> = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm
- C<sub>ma</sub> = Actual concentration of the upscale calibration gas, ppm

Commercial Testing and Engineering

Sampling System Bias Check and Measured Value Correction

JEA-SJRPP  
JACKSONVILLE, FL. - Unit 1  
Normal

Date: 10/18/00  
Pollutant: SO2  
Monitor Span: 300

IC2

Run Number	Average Measured Value	Initial Zero Gas Bias	Final Zero Gas Bias	Zero Gas Drift	Initial Upscale Gas Bias	Final Upscale Gas Bias	Upscale Gas Drift	Calibration Gas PPM	Percent Moisture	Corrected Value, Dry Basis	Corrected Value, Wet Basis
1	208.37	0.00	0.00	0.00	166.10	166.00	-0.03	166.10	10.24	208.43	187.09
2	205.89	0.00	0.20	0.07	166.00	165.00	-0.33	166.10	10.21	206.66	185.55
3	210.40	0.20	0.30	0.03	165.00	166.00	0.33	166.10	11.23	211.23	187.52
4	216.73	0.30	0.00	-0.10	166.00	166.00	0.00	166.10	11.06	216.91	192.92
5	210.54	0.00	0.29	0.10	166.00	167.00	0.33	166.10	11.24	210.07	186.46
6	202.58	0.29	0.47	0.06	167.00	167.00	0.00	166.10	11.21	201.57	178.97
7	194.41	0.47	0.57	0.03	167.00	165.00	-0.67	166.10	11.97	194.62	171.31
8	195.50	0.57	0.50	-0.02	165.00	166.00	0.33	166.10	12.14	196.31	172.47
9	191.33	0.50	0.33	-0.06	166.00	166.00	0.00	166.10	11.27	191.51	169.93
10	187.55	0.33	0.37	0.01	166.00	167.00	0.33	166.10	11.51	187.14	165.60
11	0.00	0.37	0.00	-0.12	167.00	166.10	-0.30	166.10	11.76		
12	0.00	0.00	0.00	0.00	166.10	166.10	0.00	166.10	11.52		

Avg DM

(1-3)

208.773

(4-6)

209.517

(7-9)

194.147

Avg 204.145

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \quad \text{Eq. 6C-1}$$

where:

- C<sub>gas</sub> = Effluent gas concentration, dry basis, ppm
- C<sub>avg</sub> = Average gas concentration indicated by gas analyzer, dry basis, ppm
- C<sub>o</sub> = Average of initial and final system calibration bias check responses for the zero gas, ppm
- C<sub>m</sub> = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm
- C<sub>ma</sub> = Actual concentration of the upscale calibration gas, ppm

**BEST AVAILABLE COPY**

**Commercial Testing and Engineering**

**Sampling System Bias Check and Measured Value Correction**

**JEA-SJRPP  
JACKSONVILLE, FL. - Unit 1  
Normal**

Date: 10/18/00  
Pollutant: CO2  
Monitor Span: 20

Run Number	Average Measured Percent	Initial Zero Gas Bias	Final Zero Gas Bias	Zero Gas Drift	Initial Upscale Gas Bias	Final Upscale Gas Bias	Upscale Gas Drift	Calibration Gas Percent	Percent Moisture	Corrected Percent, Dry Basis	Corrected Percent, Wet Basis
1	13.55	0.02	0.05	0.15	11.08	11.07	-0.05	11.13	10.24	13.63	12.23
2	13.58	0.05	0.05	0.00	11.07	11.08	0.05	11.13	10.21	13.66	12.26
3	13.58	0.05	0.05	0.00	11.08	11.08	0.00	11.13	11.23	13.65	12.12
4	13.50	0.05	0.04	-0.05	11.08	11.08	0.00	11.13	11.06	13.57	12.07
5	13.52	0.04	0.04	0.00	11.08	11.08	0.00	11.13	11.24	13.59	12.06
6	13.53	0.04	0.05	0.05	11.08	11.07	-0.05	11.13	11.21	13.61	12.08
7	13.73	0.05	0.05	0.00	11.07	11.08	0.05	11.13	11.97	13.81	12.16
8	13.35	0.05	0.05	0.00	11.08	11.07	-0.05	11.13	12.14	13.43	11.80
9	13.27	0.05	0.06	0.05	11.07	11.09	0.10	11.13	11.27	13.34	11.84
10	13.31	0.05	0.06	0.00	11.09	11.09	0.00	11.13	11.51	13.37	11.83
11	13.32	0.05	0.06	0.00	11.09	11.09	0.00	11.13	11.76	13.36	11.81
12	13.34	0.06	0.06	0.00	11.09	11.09	0.00	11.13	11.52	13.40	11.86

*Aug. 024  
13.647 (L-3)*

*(4-6)  
13.59*

*(7-9)  
13.527*

*Aug 13.588*

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \quad \text{Eq. 6C-1}$$

where:

- C<sub>gas</sub> = Effluent gas concentration, dry basis, ppm
- C<sub>avg</sub> = Average gas concentration indicated by gas analyzer, dry basis, ppm
- C<sub>o</sub> = Average of initial and final system calibration bias check responses for the zero gas, ppm
- C<sub>m</sub> = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm
- C<sub>ma</sub> = Actual concentration of the upscale calibration gas, ppm

IC3

Commercial Testing and Engineering

Sampling System Bias Check and Measured Value Correction

JEA-SJRPP  
JACKSONVILLE, FL. - Unit 1  
Normal

Date: 10/18/00  
Pollutant: O2  
Monitor Span: 25

Run Number	Average Measured Percent	Initial Zero Gas Bias	Final Zero Gas Bias	Zero Gas Drift	Initial Upscale Gas Bias	Final Upscale Gas Bias	Upscale Gas Drift	Calibration Gas Percent	Percent Moisture	Corrected Percent, Dry Basis	Corrected Percent, Wet Basis
1	5.77	0.01	0.01	0.00	12.00	11.99	-0.04	12.00	10.24	5.77	5.18
2	5.75	0.01	0.01	0.00	11.99	12.00	0.04	12.00	10.21	5.75	5.16
3	5.72	0.01	0.01	0.00	12.00	12.00	0.00	12.00	11.23	5.71	5.07
4	5.85	0.01	0.02	0.04	12.00	12.00	0.00	12.00	11.06	5.84	5.20
5	5.83	0.02	0.01	-0.04	12.00	12.00	0.00	12.00	11.24	5.82	5.17
6	5.80	0.01	0.02	0.04	12.00	12.01	0.04	12.00	11.21	5.79	5.14
7	5.69	0.02	0.02	0.00	12.01	12.00	-0.04	12.00	11.97	5.68	5.00
8	6.04	0.02	0.02	0.00	12.00	12.00	0.00	12.00	12.14	6.03	5.30
9	6.13	0.02	0.02	0.00	12.00	12.00	0.00	12.00	11.27	6.12	5.43
10	6.13	0.02	0.02	0.00	12.00	11.99	-0.04	12.00	11.51	6.12	5.42
11	6.09	0.02	0.02	0.00	11.99	11.99	0.00	12.00	11.76	6.09	5.37
12	6.07	0.02	0.02	0.00	11.99	11.99	0.00	12.00	11.52	6.07	5.37

Aug Dry

(1-3)

5.743

(4-6)

5.817

(7-9)

5.943

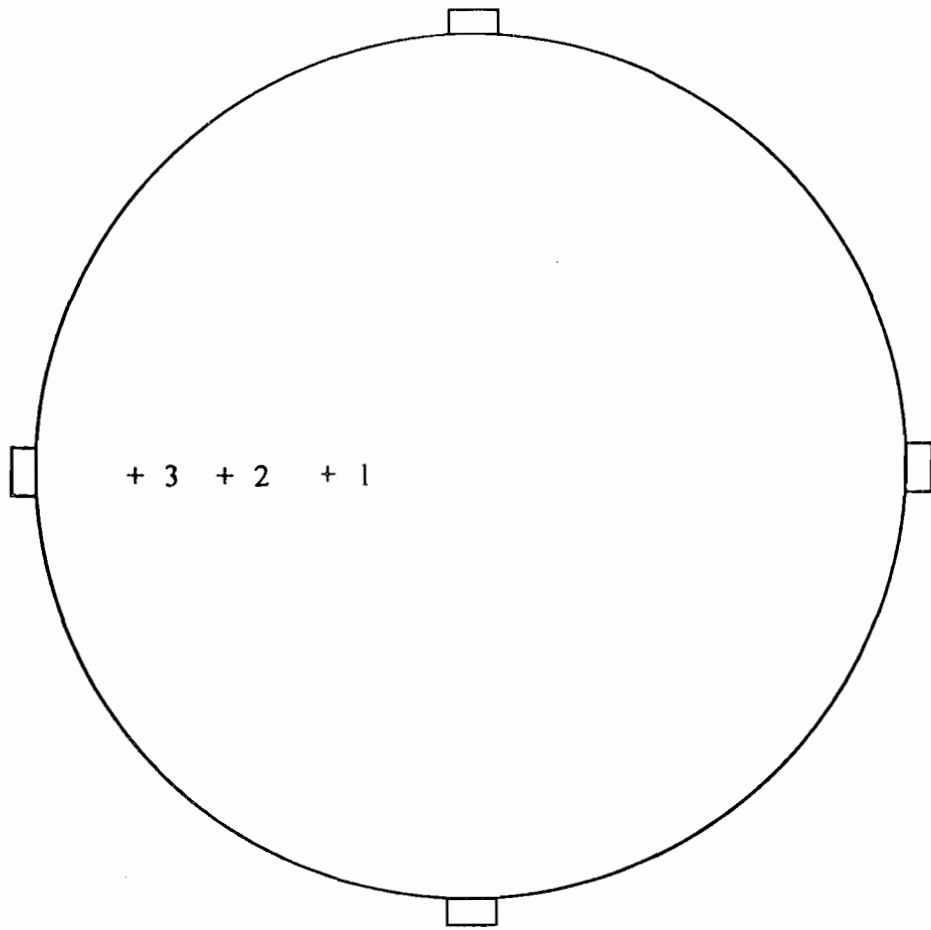
Aug 5.834

IC4

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \quad \text{Eq. 6C-1}$$

- where:
- C<sub>gas</sub> = Effluent gas concentration, dry basis, ppm
  - C<sub>avg</sub> = Average gas concentration indicated by gas analyzer, dry basis, ppm
  - C<sub>o</sub> = Average of initial and final system calibration bias check responses for the zero gas, ppm
  - C<sub>m</sub> = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm
  - C<sub>ma</sub> = Actual concentration of the upscale calibration gas, ppm

SAMPLING AND ANALYTICAL PROCEDURES



MOISTURE RATA SAMPLE POINTS	DISTANCE FROM INSIDE WALL
1)	78.74"
2)	47.24"
3)	15.75"

STACK DIAMETER = 24.50'  
 STACK AREA = 471.43 sq. ft.

DRAWING NOT TO SCALE



JACKSONVILLE ELECTRIC AUTHORITY  
 ST. JOHNS RIVER POWER PARK  
 UNIT #1

VP3.PM4

## TESTING EQUIPMENT EPA TEST METHOD 3A (O<sub>2</sub>, CO<sub>2</sub>) (Instrumental Analyzer Procedures)

Principle: A gas sample is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental analyzer for determination of either O<sub>2</sub> or CO<sub>2</sub>, or both which ever is applicable.

### 1. Sample Train

1. The CO<sub>2</sub> Monitor is a Milton Roy, Model #3300A Infrared analyzer. The O<sub>2</sub> Monitor is a Servomex instrument series 1400 Paramagnetic Sensor Analyzer. Either one of these analyzers or both, whichever is applicable, coupled together with a Strip Chart, or Data Recorder, together with sample probe, teflon sample line, calibration valve assembly, moisture removal system, particulate filter, sample pump, sample flow rate control and sample gas manifold make up the sampling system.

### 2. Measurement System Performance Specifications

1. Analyzer Calibration Error: Less than +/- 2 percent of the span for zero, mid-range and high-range calibration gases.
2. Sampling System Bias: Less than +/- 5 percent of the span for the zero, and mid or high-range calibration gases.
3. Zero Drift: Less than +/- 3 percent of the span over the period of each run.
4. Calibration Drift: Less than +/- 3 percent of the span over the period of each run.

### 3. Calibration Gases: The calibration gases for the CO<sub>2</sub> analyzer are CO<sub>2</sub> in nitrogen. The O<sub>2</sub> calibration gases for the O<sub>2</sub> analyzer are O<sub>2</sub> in nitrogen.

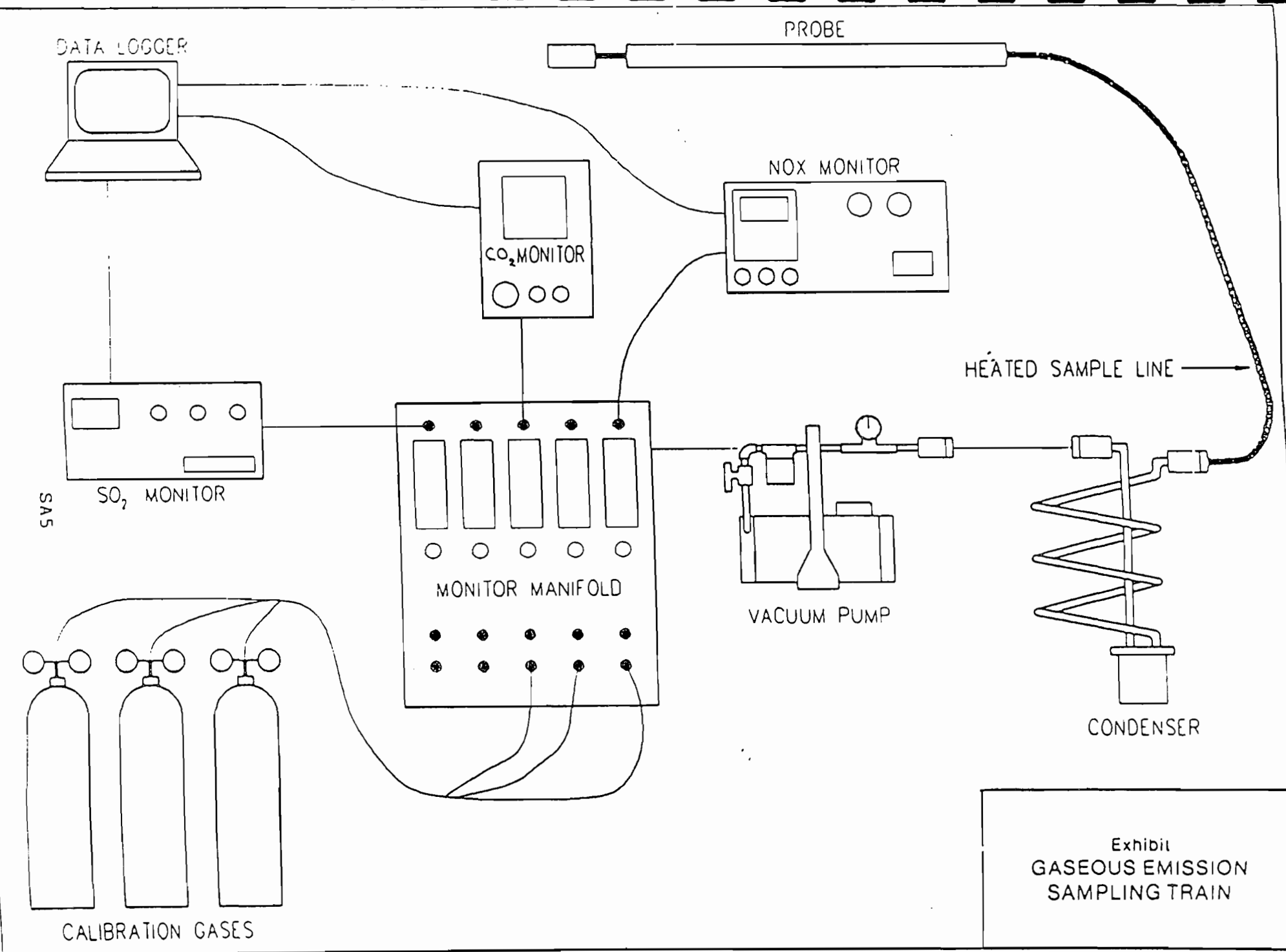
1. High-Range Gas: O<sub>2</sub> Monitor - Ambient Air/or 20-25% by volume. CO<sub>2</sub> Monitor - 16-20 percent by volume.
2. Mid-Range Gas: O<sub>2</sub> Monitor - 10-15 percent by volume CO<sub>2</sub> Monitor - 8-12 percent by volume.
3. Zero Gas: O<sub>2</sub> Monitor - any of the CO<sub>2</sub> in nitrogen gases. CO<sub>2</sub> Monitor - Purified Ambient Air/or zero gas.



4. Calibration Gas Concentration Verification:  
The calibration gases are analyzed following the Environmental Protection Agency Traceability Protocol Number One. A certification from the gas manufacturer that Protocol Number One was followed are included in the test report and available in the field during the test.
5. Measurement System Preparation  
The measurement system was assembled by following the manufacturer's written instructions for preparing and preconditioning the gas analyzer and, as applicable, the other system components. The calibration gases were introduced and all necessary adjustments to calibrate the analyzer and the data recorded were performed.
6. Analyzer Calibration Error:
  1. The analyzer calibration error check is conducted by introducing calibration gases to the measurement system at any point upstream of the gas analyzer as follows: After the measurement system is prepared for use, the zero, mid-range and the high-range gases are introduced to the analyzer. During this check, no adjustments to the system are made except those necessary to achieve the correct calibration. Error check is considered invalid if the gas concentration displayed by the analyzer exceeds  $\pm 2$  percent of the span for any of the calibration gases.
  2. Sampling Systems Bias Check:  
The sampling system bias check was performed by introducing calibration gases at the calibration valve installed at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentration, is used for this check as follows:  
  
The upscale calibration gas is introduced and the gas concentration recorded. The zero gas is introduced and recorded. During the sampling system bias check, the system is operated at the normal sampling rate, no adjustments to the measurement system, other than those necessary to achieve proper calibration gas flow rates at the analyzer, are made. Alternately, introduce the zero and upscale gases until a stable response is achieved. The tester determined the measurement system response time by observing the times required to achieve a stable response for both the zero and upscale gases. Note the longer of the two times as the response time. The sampling system bias check shall be considered invalid if the difference between the gas concentrations displayed by the measurement system for analyzer calibration error check and for the sampling system bias check exceeds  $\pm 5$  percent of the span for either the zero or upscale calibration gases

7. Sample Collection:

1. The sampling probe was positioned at the first measurement point, and the sampling began at the same rate as used during the system calibration drift test. A constant sampling rate was maintained (i.e., +/- 10 percent) during the entire run. Nine to twelve 21 minute sampling periods were performed to complete the Relative Accuracy (RATA) tests. Prior to the start of the test, the complete monitor system was leak checked. The systems response time was measured prior to the start of the test and recorded on a field Test Form. At the conclusion of each run the monitor was checked for calibration drift and the values were recorded on calibration forms included in this report.



PROBE

DATA LOGGER

NOX MONITOR

CO<sub>2</sub> MONITOR

HEATED SAMPLE LINE

SAS

SO<sub>2</sub> MONITOR

MONITOR MANIFOLD

VACUUM PUMP

CONDENSER

CALIBRATION GASES

Exhibit  
GASEOUS EMISSION  
SAMPLING TRAIN

## TESTING EQUIPMENT EPA TEST METHOD 6c (SO<sub>2</sub>) (Instrumental Analyzer Procedure)

Principle: A gas sample is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental Infrared analyzer for determination of SO<sub>2</sub> concentration.

1. Sample Train
  1. A Fuji/Milton Roy Model ZRF, Infrared SO<sub>2</sub> gas analyzer together with a Data Logger recorder, together with sample probe, sample line, calibration valve assembly, moisture removal system, particulate filter, sample pump, sample flow rate control and sample gas manifold make up the sampling system.
2. Measurement system Performance Specifications
  1. Analyzer Calibration Error: Less than +/- 2 percent of the span for zero, mid-range and high-range calibration gases.
  2. Sampling System Bias: Less than +/- 5 percent of the span for the zero, and mid or high-range calibration gases.
  3. Zero Drift: Less than +/- 3 percent of the span over the period of each run.
  4. Calibration Drift: Less than +/- 3 percent of the span over the period of each run.
3. Calibration Gases: The calibration gases for the SO<sub>2</sub> analyzer are SO<sub>2</sub> in nitrogen.
  1. High-Range Gas: Concentration equivalent of 80 to 100 percent of the span.
  2. Mid-Range Gas: Concentration equivalent of 40 to 60 percent of the span.
  3. Zero Gas: Concentration of less than 0.25 percent of the span. Purified ambient air issued for the zero gas by passing air through a charcoal filter, or through one or more impingers containing a solution of 3 percent H<sub>2</sub>O<sub>2</sub>.
4. Calibration Gas Concentration Verification: The calibration gases are analyzed following the Environmental Protection Agency Traceability Protocol Number One. A certification from the gas manufacturer that Protocol Number One was followed are included in the test report and available in the field during the test.

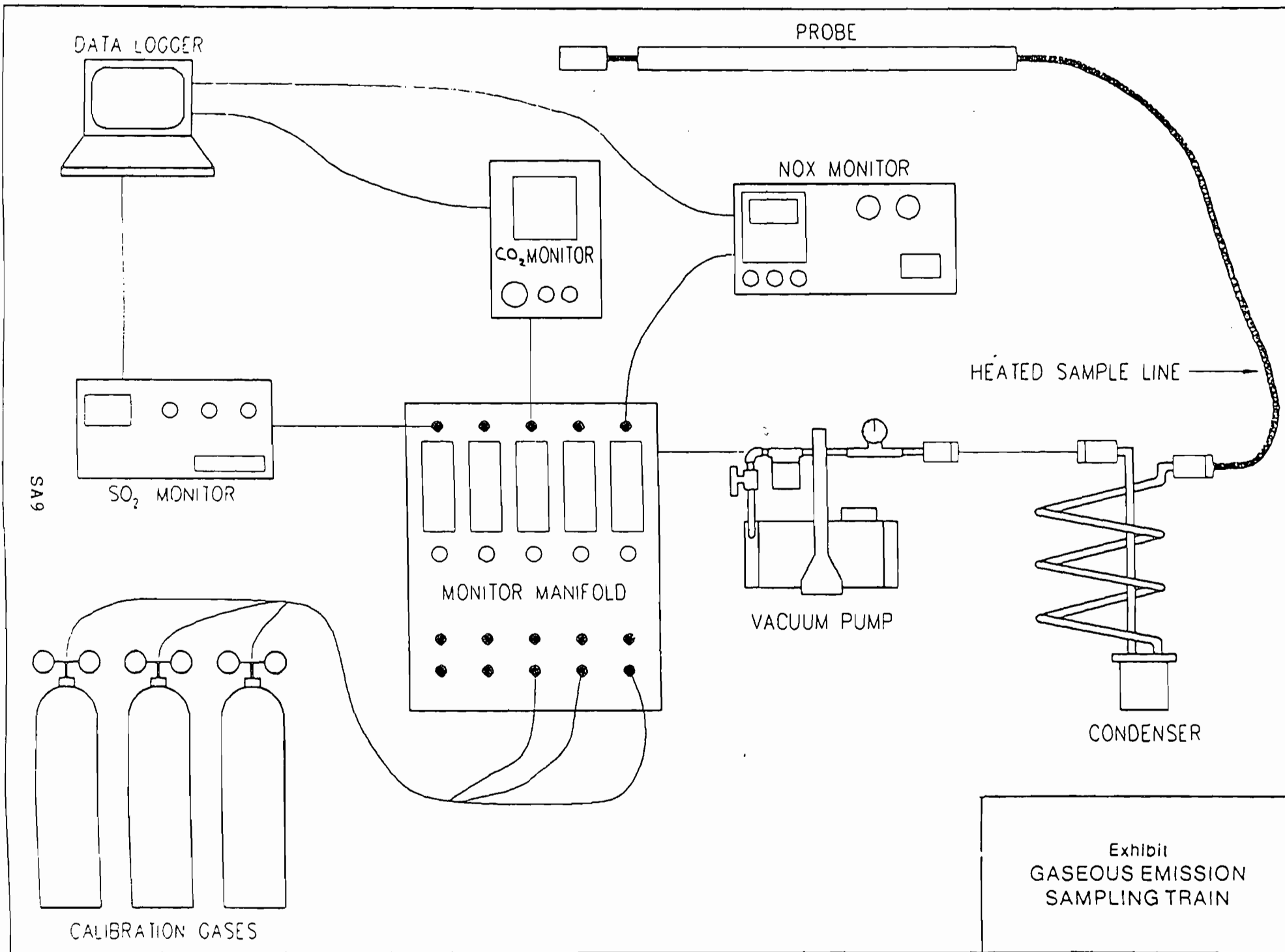
5. Measurement System Preparation

The measurement system was assembled by following the manufacturer's written instructions for preparing and preconditioning the gas analyzer and, as applicable, the other system components. The calibration gases were introduced and all necessary adjustments to calibrate the analyzer and the data recorded were performed.

6. Analyzer Calibration Error:

1. The analyzer calibration error check is conducted by introducing calibration gases to the measurement system at any point upstream of the gas analyzer as follows: After the measurement system is prepared for use, the zero, mid-range and the high-range gases are introduced to the analyzer. During this check, no adjustments to the system are made except those necessary to achieve the correct calibration. Error check is considered invalid if the gas concentration displayed by the analyzer exceeds  $\pm 2$  percent of the span for any of the calibration gases.
2. Sampling Systems Bias Check: The sampling system bias check was performed by introducing calibration gases at the calibration valve installed at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentration, is used for this check as follows: The upscale calibration gas is introduced and the gas concentration recorded. The zero gas is introduced and recorded. During the sampling system bias check, the system is operated at the normal sampling rate, no adjustments to the measurement system, other than those necessary to achieve proper calibration gas flow rates at the analyzer, are made. Alternately, introduce the zero and upscale gases until a stable response is achieved. The tester determined the measurement system response time by observing the times required to achieve a stable response for both the zero and upscale gases. Note the longer of the two times as the response time. The sampling system bias check shall be considered invalid if the difference between the gas concentrations displayed by the measurement system for analyzer calibration error check and for the sampling system bias check exceeds  $\pm 5$  percent of the span for either the zero or upscale calibration gases.

7. Sample Collection: The sampling probe was positioned at the first measurement point, and the sampling began at the same rate as used during the system calibration drift test. A constant sampling rate was maintained (i.e., +/- 10 percent) during the entire run. Nine to twelve 21 minute sampling periods were performed to complete the Relative Accuracy (RATA) tests. Prior to the start of the test, the complete monitor system was leak checked. The systems response time was measured prior to the start of the test and recorded on a Field Test Form. At the conclusion of each run the monitor was checked for calibration drift and the values were recorded on calibration forms included in this report.



## TESTING EQUIPMENT EPA TEST METHOD 7E (Instrumental Analyzer Procedure)

Principle: A gas sample is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental Chemiluminescence analyzer for determination of NO<sub>x</sub> concentration.

1. Sample Train
  1. A Thermo Electron, Model 10, Chemiluminescence NO-NO<sub>x</sub> analyzer along with a Data Logger recorder, together with sample probe, sample line, calibration valve assembly, moisture removal system, particulate filter, sample pump, sample flow rate control and sample gas manifold make up the sampling system.
2. Measurement system Performance Specifications
  1. Analyzer Calibration Error: Less than +/- 2 percent of the span for zero, mid-range and high-range calibration gases.
  2. Sampling System Bias: Less than +/- 5 percent of the span for the zero, and mid or high-range calibration gases.
  3. Zero Drift: Less than +/- 3 percent of the span over the period of each run.
  4. Calibration Drift: Less than +/- 3 percent of the span over the period of each run.
3. Calibration Gases: The calibration gases for the NO<sub>x</sub> analyzer will be NO in nitrogen.
  1. High-Range Gas: Concentration equivalent to 80 to 100 percent of the span.
  2. Mid-Range Gas: Concentration equivalent to 40 to 60 percent of the span.
  3. Zero Gas: Concentration of less than 0.25 percent of the span. Purified ambient air will be used for the zero gas by passing air through a charcoal filter, or through one or more impingers containing a solution 3 percent H<sub>2</sub>O<sub>2</sub>.
4. Calibration Gas Concentration Verification:

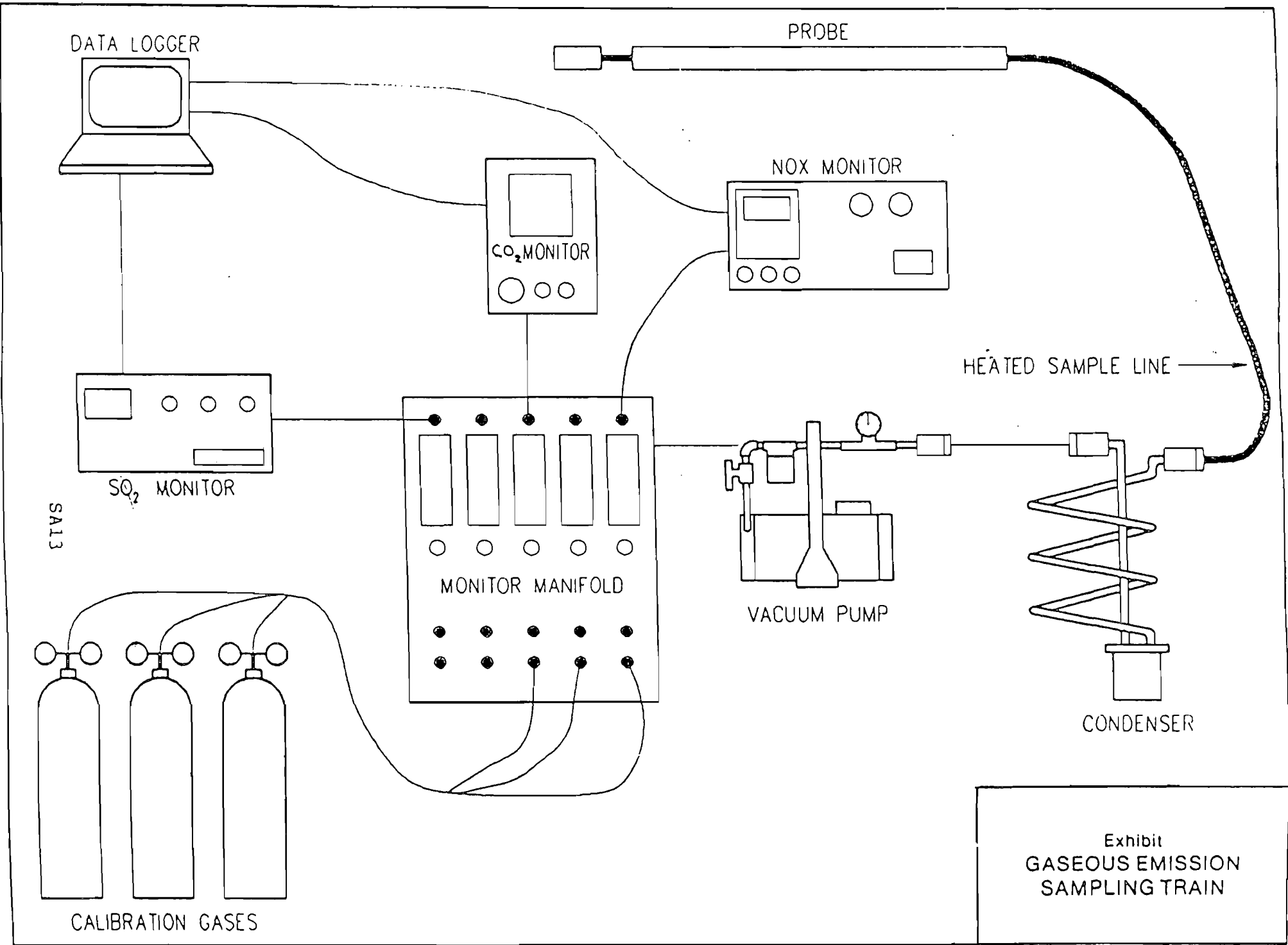
The calibration gases are analyzed following the Environmental Protection Agency Traceability Protocol Number One. A certification from the gas manufacturer that Protocol Number One was followed is included in the test report and available in the field during the test.



5. Measurement System Preparation: The measurement system was assembled by following the manufacturer's written instructions for preparing and preconditioning the gas analyzer and, as applicable, the other system components. The calibration gases were introduced and all necessary adjustments to calibrate the analyzer and the data recorded were performed.
6. Analyzer Calibration Error:
  1. The analyzer calibration error check was conducted by introducing calibration gases to the measurement system at any point upstream of the gas analyzer as follows: After the measurement system is prepared for use, the zero, mid-range and the high-range gases are introduced to the analyzer. During this check, no adjustments to the system are made except those necessary to achieve the correct calibration. Error check is considered invalid if the gas concentration displayed by the analyzer exceeds  $\pm 2$  percent of the span for any of the calibration gases.
  2. Sampling Systems Bias Check:

The sampling system bias check was performed by introducing calibration gases at the calibration valve installed at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentration, is used for this check as follows: The upscale calibration gas is introduced and the gas concentration recorded. The zero gas is introduced and recorded. During the sampling system bias check, the system shall be operated at the normal sampling rate, no adjustments to the measurement system, other than those necessary to achieve proper calibration gas flow rates at the analyzer, is made. Alternately, introduce the zero and upscale gases until a stable response is achieved. The tester determines the measurement system response time by observing the times required to achieve a stable response for both the zero and upscale gases. Note the longer of the two times as the response time. The sampling system bias check is considered invalid if the difference between the gas concentrations displayed by the measurement system for analyzer calibration error check and for the sampling system bias check exceeds  $\pm 5$  percent of the span for either the zero or upscale calibration gases.

7. Sample Collection: The sampling probe was positioned at the first measurement point, and the sampling began at the same rate as used during the system calibration drift test. A constant sampling rate was maintained (i.e., +/- 10 percent) during the entire run. Nine to twelve 21 minute sampling periods were performed to complete the Relative Accuracy (RATA) tests. Prior to the start of the test, the complete monitor system was leak checked. The systems response time was measured prior to the start of the test and recorded on a Field Test Form. At the conclusion of each run the monitor was checked for calibration drift and the values were recorded on calibration forms included in this report.



DATA LOGGER

PROBE

NOX MONITOR

CO<sub>2</sub> MONITOR

HEATED SAMPLE LINE

SO<sub>2</sub> MONITOR

SAT13

MONITOR MANIFOLD

VACUUM PUMP

CONDENSER

CALIBRATION GASES

Exhibit  
GASEOUS EMISSION  
SAMPLING TRAIN

APPENDIX

EPA Formulas

NO<sub>x</sub> CALCULATION  
(CO<sub>2</sub> BASED)

$$\text{Lb/dscf} = 1.194 \times 10^{-7} \times \text{ppm}$$

$$\text{Lb/mmBtu} = \text{Lb/dscf} \times \text{F Factor} \times \left( \frac{100}{\% \text{CO}_2} \right)$$

$$\text{Lb/hour} = \text{Lb.dscf} \times \text{dscfm} \times 60 \text{ min./hr.}$$

SO<sub>2</sub> CALCULATION  
(CO<sub>2</sub> BASED)

$$\text{Lb/dscf} = 1.660 \times 10^{-7} \times \text{ppm}$$

$$\text{Lb/mmBtu} = \text{Lb/dscf} \times \text{F Factor} \times \left( \frac{100}{\% \text{CO}_2} \right)$$

$$\text{Lb/hour} = \text{Lb.dscf} \times \text{dscfm} \times 60 \text{ min./hr.}$$

Test Data Sheets

STACK  
RATA

### MOLYTECH RATA TIME RECORDS

Client: SEA/SRPP Project #: 00-205 Date: 10-18-00  
Sample Location: Unit I Run #: 1-ALL  
Bp (in): \_\_\_\_\_  
Initial Leak Check: ok Final Leak Check: ok  
Operator: Rick Howes

RUN NUMBER	START TIME	STOP TIME	MOLYTECH FILE #
1	08:55	09:16	A831018-A
2	09:30	9:51	B
3	10:02	10:23	C
4	10:37	10:58	D
5	11:11	11:32	E
6	11:45	12:06	F
<del>VOID → 7</del>	<del>72:19</del>	<del>12:40</del>	<del>G</del>
7	12:47	13:08	H
8	13:19	13:40	I
9	13:52	14:13	J
10	14:26	14:47	K
11	15:00	15:21	L
12	15:30	15:51	M

LOSE ←  
power  
to trails  
during  
run  
→  
loss from  
got well  
from  
vents  
on stack

Channels  
1, 2, 3, 4, 5

T1





STACK  
DATA

## MONITOR SYSTEM RESPONSE TIME

CLIENT: JEA/SJ RPP  
 LOCATION: STACK  
 UNIT: 1

DATE: 10-18-00  
 BY: R. Howes

ANALYZER TYPE:	SO <sub>2</sub>	NO <sub>x</sub>	CO <sub>2</sub>	O <sub>2</sub>	CO
ANALYZER SPAN:	<u>0-300</u>	<u>0-1000</u>	<u>0-20%</u>	<u>0-25%</u>	<u>0-1000</u>

UPSCALE GAS	SPAN GAS CONCENTRATION	95% OF SPAN GAS VALUE	MONITOR SYSTEM RESPONSE	TIME (SECONDS)
SO <sub>2</sub>	<u>166.1</u>	<u>157.795</u>	<u>162</u>	<u>120 sec.</u>
NO <sub>x</sub>	<u>558</u>	<u>530.1</u>	<u>555</u>	<u>70 sec.</u>
CO <sub>2</sub>	<u>11.13</u>	<u>10.574</u>	<u>11.0</u>	<u>75 sec.</u>
O <sub>2</sub>	<u>12.0</u>	<u>11.4</u>	<u>11.95</u>	<u>75 sec.</u>
CO	<u>322</u>	<u>305.9</u>	<u>319</u>	<u>70 sec.</u>

DOWN SCALE GAS	SPAN GAS CONCENTRATION	5% OF SPAN GAS VALUE	MONITOR SYSTEM RESPONSE	TIME (SECONDS)
SO <sub>2</sub>	<u>166.1</u>	<u>8.305</u>	<u>4.1</u>	<u>120 sec.</u>
NO <sub>x</sub>	<u>558</u>	<u>27.9</u>	<u>1.2</u>	<u>65 sec.</u>
CO <sub>2</sub>	<u>11.13</u>	<u>0.556</u>	<u>.20</u>	<u>60 sec.</u>
O <sub>2</sub>	<u>12.0</u>	<u>0.60</u>	<u>.10</u>	<u>60 sec.</u>
CO	<u>322</u>	<u>16.1</u>	<u>1.0</u>	<u>65 sec.</u>

SLOWEST RESPONSE TIME = 120 sec. = 2 min

TWICE SYSTEM RESPONSE TIME = 4 min

STACK  
DATA

ANALYZER CALIBRATION DATA

CLIENT SEA/SSRPP PROJECT # 00-205 TEST DATE 10-18-00  
SOURCE IDENTIFICATION UNIT I STACK OPERATOR Rick Howes

CALIBRATION DATA FOR		CYLINDER NUMBER	CYLINDER VALUE % OR PPM	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE % OR PPM	DIFFERENCE % OF SPAN
SAMPLING RUNS	GAS TYPE					
<u>1-ALL</u>	<u>NOX</u>					
SPAN <u>0-1000</u>						
ZERO GAS			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
LOW-RANGE GAS						
MED-RANGE GAS		<u>ALM046485</u>	<u>558</u>	<u>558</u>	<u>0</u>	<u>0</u>
HIGH-RANGE GAS		<u>AAL9543</u>	<u>876</u>	<u>875</u>	<u>-1</u>	<u>-.10</u>

CALIBRATION DATA FOR		CYLINDER NUMBER	CYLINDER VALUE % OR PPM	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE % OR PPM	DIFFERENCE % OF SPAN
SAMPLING RUNS	GAS TYPE					
<u>1-ALL</u>	<u>SO2</u>					
SPAN <u>0-300</u>						
ZERO GAS			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
LOW-RANGE GAS						
MED-RANGE GAS		<u>AAL021741</u>	<u>166.1</u>	<u>166.1</u>	<u>0</u>	<u>0</u>
HIGH-RANGE GAS		<u>SG9114792</u>	<u>247</u>	<u>247</u>	<u>0</u>	<u>0</u>

CALIBRATION DATA FOR		CYLINDER NUMBER	CYLINDER VALUE % OR PPM	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE % OR PPM	DIFFERENCE % OF SPAN
SAMPLING RUNS	GAS TYPE					
<u>1-ALL</u>	<u>CO2</u>					
SPAN <u>0-207</u>						
ZERO GAS			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
LOW-RANGE GAS						
MED-RANGE GAS		<u>ALM046485</u>	<u>11.13</u>	<u>11.11</u>	<u>-.02</u>	<u>-.10</u>
HIGH-RANGE GAS		<u>AAL9543</u>	<u>18.06</u>	<u>18.12</u>	<u>+0.06</u>	<u>.30</u>

CALIBRATION DATA FOR		CYLINDER NUMBER	CYLINDER VALUE % OR PPM	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE % OR PPM	DIFFERENCE % OF SPAN
SAMPLING RUNS	GAS TYPE					
<u>1-ALL</u>	<u>OL</u>					
SPAN <u>0-257</u>						
ZERO GAS			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
LOW-RANGE GAS						
MED-RANGE GAS		<u>SG900075</u>	<u>12.0</u>	<u>12.0</u>	<u>0</u>	<u>0</u>
HIGH-RANGE GAS		<u>SG9173770</u>	<u>22.1</u>	<u>22.2</u>	<u>+0.1</u>	<u>+0.40</u>

CALIBRATION DATA FOR		CYLINDER NUMBER	CYLINDER VALUE % OR PPM	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE % OR PPM	DIFFERENCE % OF SPAN
SAMPLING RUNS	GAS TYPE					
<u>1-ALL</u>	<u>CO</u>					
SPAN <u>0-1000</u>						
ZERO GAS			<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
LOW-RANGE GAS		<u>SG9163578</u>	<u>322</u>	<u>322</u>	<u>0</u>	<u>0</u>
MED-RANGE GAS		<u>SG1813NB</u>	<u>608</u>	<u>610</u>	<u>+2</u>	<u>+0.20</u>
HIGH-RANGE GAS						

DIFFERENCE = (ABSOLUTE DIFFERENCE / SPAN) X 100

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 1 LOAD High  
 Test Date : 10/18/88 Time : 08:55 thru 09:16

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
08:55:59	289.89	219.26	5.53	13.76	322.58
08:56:59	289.31	213.87	5.57	13.67	255.21
08:57:59	291.19	204.16	5.88	13.47	92.86
08:58:59	287.19	204.39	5.87	13.53	111.89
08:59:59	283.24	207.40	5.79	13.57	113.27
09:00:59	285.21	209.69	5.72	13.56	96.93
09:01:59	286.78	206.42	5.77	13.59	125.13
09:02:59	285.49	209.22	5.65	13.71	236.83
09:03:59	285.80	209.59	5.65	13.63	281.85
09:04:59	286.29	206.34	5.85	13.48	113.66
09:05:59	289.94	204.72	6.00	13.38	135.03
09:06:59	285.13	202.84	5.88	13.49	121.86
09:07:59	278.84	205.19	5.69	13.62	239.46
09:08:59	280.83	205.06	5.85	13.48	159.64
09:09:59	286.10	205.64	5.84	13.50	171.76
09:10:59	287.90	205.15	5.87	13.50	93.62
09:11:59	284.09	209.43	5.76	13.56	167.39
09:12:59	285.62	211.48	5.76	13.54	169.22
09:13:59	289.06	210.62	5.82	13.47	132.87
09:14:59	288.62	212.23	5.84	13.51	89.23
09:15:59	286.86	213.15	5.69	13.64	163.26
Averages for 21 Points	286.35	208.37	5.77	13.55	161.59

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 2 LOAD High  
 Test Date : 10/18/00 Time : 09:30 thru 09:51

Pa

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
09:30:01	284.51	219.21	5.74	13.54	133.72
09:31:01	286.39	218.81	5.81	14.14	223.76
09:32:01	282.02	209.94	5.62	13.59	297.44
09:33:01	281.10	206.83	5.65	13.60	259.01
09:34:01	280.37	205.58	5.65	13.59	168.84
09:35:01	285.38	204.63	5.73	13.54	179.81
09:36:01	285.25	204.21	5.79	13.50	142.52
09:37:01	290.46	196.92	6.04	13.35	65.36
09:38:01	284.01	198.45	5.84	13.51	96.87
09:39:01	282.34	200.98	5.77	13.56	224.35
09:40:01	281.46	202.53	5.74	13.53	200.52
09:41:01	283.73	204.38	5.88	13.46	88.49
09:42:01	282.12	202.23	5.92	13.45	152.74
09:43:01	283.95	210.73	5.64	13.65	226.19
09:44:01	283.34	212.90	5.63	13.65	195.63
09:45:01	286.47	209.23	5.84	13.55	140.71
09:46:01	287.08	208.31	5.71	13.58	186.21
09:47:01	289.51	203.40	5.77	13.54	150.36
09:48:01	289.57	198.98	5.79	13.55	168.38
09:49:01	283.79	202.65	5.63	13.72	142.02
09:50:01	283.64	202.80	5.72	13.60	111.61
Averages for 21 Points	284.59	205.89	5.75	13.58	169.26

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 3 LOAD High  
 Test Date : 10/18/~~00~~ Time : 10:02 thru 10:23

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
10:02:01	282.34	225.72	5.71	13.58	119.82
10:03:01	282.77	220.88	5.66	13.58	208.27
10:04:01	288.71	221.50	5.51	13.73	312.55
10:05:01	287.19	215.24	5.77	13.52	107.96
10:06:01	287.77	214.47	5.59	13.71	176.01
10:07:01	287.38	207.78	5.67	13.58	108.40
10:08:01	293.37	202.20	5.75	13.54	67.45
10:09:01	292.95	199.69	5.83	13.53	69.59
10:10:01	297.30	200.80	5.80	13.55	111.72
10:11:01	298.29	204.91	5.73	13.60	86.38
10:12:01	296.18	209.65	5.69	13.60	103.99
10:13:01	298.40	212.83	5.67	13.66	64.65
10:14:01	294.25	215.45	5.58	13.74	160.08
10:15:01	297.20	217.45	5.52	13.74	161.22
10:16:01	303.01	210.55	5.84	13.49	60.08
10:17:01	304.88	204.09	5.90	13.47	71.09
10:18:01	299.80	201.69	5.86	13.51	192.11
10:19:01	301.78	202.67	5.82	13.55	111.87
10:20:01	304.19	208.32	5.77	13.57	142.67
10:21:01	303.83	210.18	5.82	13.53	64.44
10:22:01	304.85	212.46	5.82	13.54	84.44
Averages					
for 21					
Points	295.54	210.40	5.72	13.58	123.08

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 4 LOAD High  
 Test Date : 10/18/00 Time : 10:37 thru 10:58

Pa

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
10:37:00	306.90	226.33	5.68	13.62	106.35
10:38:00	306.29	222.78	5.79	13.58	129.99
10:39:00	306.29	226.52	5.68	13.64	107.17
10:40:00	311.21	221.54	5.90	13.46	35.44
10:41:00	308.33	218.35	6.04	13.37	21.36
10:42:00	295.36	219.56	5.90	13.50	68.49
10:43:00	298.39	219.29	6.00	13.41	57.26
10:44:00	306.38	214.43	6.04	13.32	19.06
10:45:00	306.10	214.80	6.11	13.31	19.71
10:46:00	304.19	213.31	6.01	13.39	24.73
10:47:00	304.03	210.14	5.83	13.56	81.45
10:48:00	302.54	211.94	5.65	13.68	175.30
10:49:00	297.07	215.83	5.53	13.70	144.85
10:50:00	305.05	210.96	5.97	13.38	36.18
10:51:00	308.33	210.14	5.93	13.47	50.71
10:52:00	304.14	213.50	5.89	13.51	71.71
10:53:00	307.89	214.36	5.84	13.51	83.22
10:54:00	305.19	217.20	5.83	13.53	59.58
10:55:00	297.37	220.94	5.70	13.55	40.11
10:56:00	302.92	214.88	5.88	13.51	70.39
10:57:00	301.65	214.57	5.74	13.57	57.09
Averages for 21 Points	304.07	216.73	5.85	13.50	69.53

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 5 LOAD High  
 Test Date : 10/18/00 Time : 11:11 thru 11:32

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
11:11:00	299.50	221.49	5.87	13.46	62.67
11:12:00	301.04	219.35	5.83	13.52	57.68
11:13:00	299.16	218.38	5.81	13.54	44.27
11:14:00	301.76	215.61	5.91	13.46	65.14
11:15:00	300.24	218.59	5.73	13.58	60.05
11:16:00	298.53	214.13	5.88	13.52	54.31
11:17:00	300.52	210.82	5.70	13.66	54.52
11:18:00	302.81	206.87	5.78	13.58	57.78
11:19:00	297.45	209.75	5.71	13.60	73.66
11:20:00	300.27	207.22	5.85	13.54	50.19
11:21:00	298.39	211.57	5.80	13.61	79.14
11:22:00	302.12	209.97	5.82	13.50	41.82
11:23:00	297.48	209.77	5.86	13.51	52.06
11:24:00	304.08	211.51	5.95	13.45	46.57
11:25:00	302.23	211.32	5.96	13.46	43.47
11:26:00	298.55	208.23	5.93	13.45	35.15
11:27:00	294.77	209.31	5.71	13.61	120.58
11:28:00	293.56	205.82	5.81	13.53	81.02
11:29:00	302.42	204.24	5.92	13.50	55.16
11:29:59	298.03	207.57	5.65	13.66	89.31
11:30:59	296.79	202.10	5.94	13.38	32.33
11:31:59	297.01	198.36	5.91	13.44	33.31
Averages for 22 Points	299.39	210.54	5.83	13.52	58.64

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 6 LOAD High  
 Test Date : 10/18/80 Time : 11:45 thru 12:06

Pa

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
11:45:01	297.21	220.34	5.96	13.41	23.82
11:46:01	300.57	214.66	5.89	13.51	39.86
11:47:01	294.58	206.66	5.68	13.67	48.10
11:48:01	296.82	206.21	5.60	13.66	73.28
11:49:01	300.27	200.29	5.82	13.53	77.24
11:50:01	301.35	197.68	5.92	13.46	25.32
11:51:01	293.06	199.36	5.79	13.56	129.48
11:52:01	292.68	197.79	5.90	13.46	46.12
11:53:01	297.65	200.48	5.89	13.51	55.01
11:54:01	296.88	204.14	5.84	13.53	39.38
11:55:01	296.04	206.12	5.66	13.66	218.60
11:56:01	292.82	206.62	5.66	13.61	94.01
11:57:01	297.49	204.11	5.80	13.49	67.54
11:58:01	297.21	201.66	5.71	13.65	71.82
11:59:01	293.16	203.40	5.67	13.64	86.32
12:00:01	297.32	200.04	5.88	13.44	42.77
12:01:01	299.48	197.95	5.98	13.43	28.55
12:02:01	295.67	196.58	5.91	13.49	26.86
12:03:01	294.42	195.90	5.87	13.51	46.90
12:04:01	289.37	199.40	5.69	13.61	160.98
12:05:01	298.98	194.83	5.88	13.39	44.51
Averages for 21 Points					
	296.33	202.58	5.80	13.53	68.87



Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 7 LOAD High  
 Test Date : 10/18/00 Time : 12:47 thru 13:08

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
12:47:02	292.32	191.41	5.64	13.78	89.93
12:48:02	304.14	194.32	5.51	13.87	129.86
12:49:02	302.26	191.23	5.68	13.73	45.73
12:50:02	312.55	192.48	5.75	13.66	41.75
12:51:02	313.45	190.99	5.90	13.59	35.58
12:52:02	305.43	193.98	5.67	13.77	81.17
12:53:02	306.56	195.98	5.66	13.74	41.05
12:54:02	309.56	196.94	5.76	13.68	45.55
12:55:02	311.68	198.93	5.75	13.75	22.43
12:56:02	307.38	199.78	5.63	13.81	35.48
12:57:02	306.66	196.39	5.76	13.66	62.12
12:58:02	310.91	194.57	5.74	13.71	93.01
12:59:02	312.26	196.37	5.66	13.77	91.52
13:00:02	311.93	196.72	5.56	13.86	137.95
13:01:02	313.23	193.88	5.66	13.72	63.87
13:02:02	311.30	191.81	5.67	13.71	36.71
13:03:02	311.30	192.20	5.72	13.72	51.48
13:04:02	311.71	195.10	5.65	13.77	74.51
13:05:02	313.04	195.62	5.69	14.00	60.97
13:06:02	305.09	193.48	5.78	13.62	21.16
13:07:02	311.77	190.52	5.83	13.57	23.69
Averages for 21 Points	308.78	194.41	5.69	13.73	61.21

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 8 LOAD High  
 Test Date : 10/18/88 Time : 13:19 thru 13:40

Pa

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
13:19:02	316.62	203.80	5.93	13.55	54.74
13:20:02	315.77	196.93	5.92	13.44	24.22
13:21:02	313.04	194.72	5.88	13.51	50.49
13:22:02	315.52	194.85	5.79	13.56	36.79
13:23:02	317.84	194.29	5.90	13.47	21.77
13:24:02	316.49	194.45	5.97	13.42	13.40
13:25:02	316.71	193.83	6.04	13.41	35.31
13:26:02	312.85	197.64	5.80	13.57	38.50
13:27:01	309.89	199.45	5.73	13.59	29.59
13:28:01	306.11	197.64	5.85	13.53	23.26
13:29:01	307.02	199.60	5.90	13.45	21.06
13:30:01	319.94	195.54	6.05	13.40	78.23
13:31:01	329.01	195.40	6.13	13.26	29.13
13:32:01	320.16	193.01	6.22	13.20	23.18
13:33:01	330.06	194.02	6.17	13.25	20.88
13:34:01	330.81	193.42	6.22	13.21	37.61
13:35:01	331.50	193.99	6.36	13.08	12.27
13:36:01	327.00	195.42	6.30	13.12	38.43
13:37:01	328.63	192.85	6.30	13.17	20.21
13:38:01	325.98	191.57	6.29	13.17	9.37
13:39:01	323.44	193.17	6.26	13.16	15.15
Averages for 21 Points	319.73	195.50	6.04	13.35	30.17

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 9 LOAD High  
 Test Date : 10/18/00 Time : 13:52 thru 14:13

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
13:52:02	319.02	200.75	6.30	13.11	17.73
13:53:02	315.44	196.04	6.26	13.16	19.96
13:54:02	314.72	194.13	6.25	13.20	11.44
13:55:02	305.40	196.45	6.11	13.29	39.39
13:56:02	300.07	193.61	6.05	13.32	24.18
13:57:02	301.37	189.03	6.29	13.14	17.48
13:58:01	304.71	189.94	6.09	13.32	56.33
13:59:01	310.94	190.21	6.14	13.29	16.79
14:00:01	307.91	191.77	6.03	13.34	33.53
14:01:01	311.05	189.86	6.14	13.23	15.53
14:02:01	313.73	187.04	6.33	13.15	11.44
14:03:01	312.76	185.64	6.22	13.22	16.24
14:04:01	307.69	190.32	5.97	13.37	38.63
14:05:01	312.10	189.19	6.14	13.27	23.70
14:06:01	312.57	192.33	5.93	13.41	30.41
14:07:01	317.89	187.31	6.19	13.26	21.00
14:08:01	316.49	186.24	6.19	13.22	20.67
14:09:01	314.14	192.04	6.05	13.31	14.56
14:10:01	298.97	193.60	6.01	13.43	30.66
14:11:01	304.65	191.62	6.10	13.28	39.39
14:12:01	315.49	190.89	6.04	13.37	28.83
Averages for 21 Points	310.33	191.33	6.13	13.27	25.13

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 10 LOAD High  
 Test Date : 10/18/00 Time : 14:26 thru 14:47

Pa

Time	1032 NOX PPM	1031 SO2 PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
14:26:01	302.09	199.69	6.04	13.28	29.97
14:27:01	301.98	196.73	6.14	13.22	23.63
14:28:01	303.02	191.89	6.17	13.24	13.19
14:29:01	297.83	191.67	6.17	13.23	22.94
14:30:01	310.17	188.70	6.34	13.08	11.30
14:31:01	311.27	183.64	6.39	13.08	7.77
14:32:00	303.38	185.67	6.05	13.39	64.83
14:33:00	313.87	186.81	6.16	13.26	14.81
14:34:00	311.22	184.16	6.26	13.14	14.68
14:35:00	307.85	186.83	6.18	13.27	16.17
14:36:00	299.11	189.70	6.10	13.30	30.15
14:37:00	293.83	187.45	6.01	13.41	40.26
14:38:00	300.65	184.82	6.06	13.34	36.70
14:39:00	302.77	184.20	6.26	13.19	36.97
14:40:00	302.88	185.84	6.07	13.39	23.47
14:41:00	305.73	184.87	6.10	13.32	28.63
14:42:00	304.21	185.97	6.07	14.01	35.49
14:43:00	297.09	184.34	6.10	13.32	15.78
14:44:00	302.53	184.89	6.18	13.30	13.11
14:45:00	302.16	185.43	6.07	13.43	44.22
14:46:00	304.07	185.26	5.98	13.44	34.64
Averages for 21 Points	303.70	187.55	6.13	13.31	26.60

Client :JEA/SJRPP  
 Site :JACKSONVILLE, FL.  
 Unit :1  
 Project :00-205  
 Comment :RUN 11 LOAD High  
 Test Date :10/18/00 Time :15:00 thru 15:21

Time	1032 NOX PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
15:00:02	301.50	6.15	13.27	18.62
15:01:02	302.25	6.13	13.33	14.08
15:02:02	300.57	6.05	13.38	23.07
15:03:02	299.91	6.07	13.31	47.13
15:04:02	302.70	6.13	13.24	35.52
15:05:02	305.56	6.22	13.24	13.81
15:06:02	299.33	5.98	13.41	51.60
15:07:01	303.63	6.11	13.27	33.27
15:08:01	299.09	6.09	13.34	32.02
15:09:01	301.12	6.08	13.36	22.55
15:10:01	303.77	6.25	13.24	18.68
15:11:01	305.03	6.20	13.25	14.74
15:12:01	305.75	6.14	13.29	21.90
15:13:01	300.21	6.09	13.36	33.66
15:14:01	303.82	6.05	13.36	52.59
15:15:01	304.59	6.01	13.38	35.24
15:16:01	306.63	6.00	13.39	24.11
15:17:01	300.20	6.04	13.39	41.54
15:18:01	305.70	6.16	13.30	35.43
15:19:01	295.79	5.95	13.50	35.72
15:20:01	303.23	6.19	13.28	22.32
Averages for 21 Points	302.39	6.09	13.32	29.88

Client : JEA/SJRPP  
 Site : JACKSONVILLE, FL.  
 Unit : 1  
 Project : 00-205  
 Comment : RUN 12 LOAD High  
 Test Date : 10/18/88 Time : 15:30 thru 15:51

Pa

Time	1032 NOX PPM	1030 O2 %	1029 CO2 %	1028 CO PPM
15:30:01	307.52	6.13	13.31	30.63
15:31:01	304.65	6.13	13.31	25.38
15:32:01	307.41	6.02	13.37	48.19
15:33:01	305.56	6.04	13.40	34.59
15:34:01	291.59	6.01	13.40	17.81
15:35:01	289.13	6.16	13.26	20.26
15:36:01	305.26	6.29	13.16	11.50
15:37:01	305.28	6.25	13.23	18.75
15:38:00	306.44	6.10	13.34	23.10
15:39:00	303.18	6.00	13.43	41.73
15:40:00	305.48	5.97	13.37	30.91
15:41:00	295.32	6.05	13.35	14.67
15:42:00	296.73	6.28	13.22	22.76
15:43:00	302.05	6.20	13.29	33.56
15:44:00	292.53	6.01	13.41	25.63
15:45:00	293.39	5.95	13.43	30.62
15:46:00	291.26	5.87	13.56	74.15
15:47:00	291.78	5.93	13.45	48.19
15:48:00	294.37	6.10	13.28	34.23
15:49:00	305.50	6.13	13.28	16.33
15:50:00	294.92	6.02	13.38	30.30
Averages for 21 Points	299.49	6.07	13.34	30.15

SPACE  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR B. Howes

RUN NO. / GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.10	.01	.1	.01	0
UPSCALE GAS 558	558	557	.10	558	0	.10

RUN NO. / GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	0	0	0	0	0
UPSCALE GAS 166.1	166.1	166.1	0	166	.03	.03

RUN NO. / GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.10	.05	.25	.15
UPSCALE GAS 11.13	11.11	11.08	-.15	11.07	-.20	-.05

RUN NO. / GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.01	.04	.01	.04	0
UPSCALE GAS 12.0	12.0	12.0	0	11.99	-.04	-.04

RUN NO. / GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	0	0	1.0	.10	.10
UPSCALE GAS 322	322	321	.10	322	0	.10

SYSTEM CALIBRATION BIAS - (SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE / SPAN) X 100

DRIFT - (FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN) X 100



SPACE  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR B. Howes

RUN NO. 2 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.10	.01	.30	.03	.02
UPSCALE GAS 558	558	558	0	557	.01	.01

RUN NO. 2 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	0	0	.2	.06	.06
UPSCALE GAS 166.1	166.1	166	.03	165	-.36	-.33

RUN NO. 2 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.05	.25	.05	.25	0
UPSCALE GAS 11.13	11.11	11.07	-.20	11.08	-.15	.05

RUN NO. 2 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.01	.04	.01	.04	0
UPSCALE GAS 12.0	12.0	11.99	-.04	12.0	0	+0.04

RUN NO. 2 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	1.0	.10	.60	.06	-.04
UPSCALE GAS 322	322	322	0	323	+1	+1.0

SYSTEM CALIBRATION BIAS - (SYSTEMCAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT - (FNAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100





SPACE  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION unit I OPERATOR R. Howes

RUN NO. <u>3</u> GAS TYPE: <u>NOx</u> SPAN: <u>0-1000</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.30</u>	<u>.03</u>	<u>.62</u>	<u>.062</u>	<u>.032</u>
UPSCALE GAS <u>558</u>	<u>558</u>	<u>557</u>	<u>.01</u>	<u>555</u>	<u>-.30</u>	<u>-.20</u>

RUN NO. <u>3</u> GAS TYPE: <u>SO2</u> SPAN: <u>0-300</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.2</u>	<u>.06</u>	<u>.3</u>	<u>.10</u>	<u>.033</u>
UPSCALE GAS <u>166.1</u>	<u>166.1</u>	<u>165</u>	<u>-.36</u>	<u>166</u>	<u>.033</u>	<u>.333</u>

RUN NO. <u>3</u> GAS TYPE: <u>CO2</u> SPAN: <u>0-200</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.05</u>	<u>.25</u>	<u>.05</u>	<u>.25</u>	<u>0</u>
UPSCALE GAS <u>11.13</u>	<u>11.11</u>	<u>11.08</u>	<u>-.15</u>	<u>11.08</u>	<u>-.15</u>	<u>0</u>

RUN NO. <u>3</u> GAS TYPE: <u>O2</u> SPAN: <u>0-250</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.01</u>	<u>.04</u>	<u>.01</u>	<u>.04</u>	<u>0</u>
UPSCALE GAS <u>12.0</u>	<u>12.0</u>	<u>12.0</u>	<u>0</u>	<u>12.0</u>	<u>0</u>	<u>0</u>

RUN NO. <u>3</u> GAS TYPE: <u>CO</u> SPAN: <u>0-1000</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.60</u>	<u>.06</u>	<u>.80</u>	<u>.09</u>	<u>.02</u>
UPSCALE GAS <u>322</u>	<u>322</u>	<u>323</u>	<u>.1</u>	<u>324</u>	<u>.20</u>	<u>.10</u>

SYSTEM CALIBRATION BIAS - (SYSTEMCAL RESPONSE - ANALYZER CAL. RESPONSE / SPAN ) X 100

DRIFT - ( FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN ) X 100



SPACE  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR B. Howes

RUN NO. 4 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.62	.062	.36	.036	-.026
UPSCALE GAS 558	558	555	-.30	559	.10	.40

RUN NO. 4 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.30	.10	0	0	-.10
UPSCALE GAS 166.1	166.1	166	.033	166	-.033	0

RUN NO. 4 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.05	.25	.04	.20	-.05
UPSCALE GAS 11.13	11.11	11.08	-.15	11.08	-.15	0

RUN NO. 4 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.01	.04	.02	.08	.04
UPSCALE GAS 12.0	12.0	12.0	0	12.0	0	0

RUN NO. 4 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.80	.08	.79	-.080	-.001
UPSCALE GAS 322	322	324	.20	324	.20	0

SYSTEM CALIBRATION BIAS = (SYSTEM CAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100



SPACE  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/STRPP PROJECT # 00-205 TEST DATE 10-18-09  
 SOURCE IDENTIFICATION unit I OPERATOR B. Howes

RUN NO. <u>5</u> GAS TYPE: <u>NOx</u> SPAN: <u>0-1000</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.36</u>	<u>.036</u>	<u>.48</u>	<u>.048</u>	<u>.012</u>
UPSCALE GAS <u>558</u>	<u>558</u>	<u>559</u>	<u>.10</u>	<u>559</u>	<u>.10</u>	<u>0</u>

RUN NO. <u>5</u> GAS TYPE: <u>SO2</u> SPAN: <u>0-300</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>.29</u>	<u>.096</u>	<u>.096</u>
UPSCALE GAS <u>166.1</u>	<u>166.1</u>	<u>166</u>	<u>-.023</u>	<u>167</u>	<u>.30</u>	<u>.333</u>

RUN NO. <u>5</u> GAS TYPE: <u>CO2</u> SPAN: <u>0-20%</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.04</u>	<u>.20</u>	<u>.04</u>	<u>.20</u>	<u>0</u>
UPSCALE GAS <u>11.13</u>	<u>11.11</u>	<u>11.08</u>	<u>-.15</u>	<u>11.08</u>	<u>.15</u>	<u>0</u>

RUN NO. <u>5</u> GAS TYPE: <u>O2</u> SPAN: <u>0-25%</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.02</u>	<u>.08</u>	<u>.07</u>	<u>.04</u>	<u>-.04</u>
UPSCALE GAS <u>12.0</u>	<u>12.0</u>	<u>12.0</u>	<u>0</u>	<u>12.0</u>	<u>0</u>	<u>0</u>

RUN NO. <u>5</u> GAS TYPE: <u>CO</u> SPAN: <u>0-1000</u>	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS <u>0</u>	<u>0</u>	<u>.79</u>	<u>-.079</u>	<u>.76</u>	<u>.076</u>	<u>-.003</u>
UPSCALE GAS <u>322</u>	<u>322</u>	<u>324</u>	<u>.20</u>	<u>323</u>	<u>.10</u>	<u>-.10</u>

SYSTEM CALIBRATION BIAS - (SYSTEMCAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT - (FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN) X 100

SPACE  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION unit I OPERATOR R. Howes

RUN NO. 6 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.48	.048	.30	.03	-.018
UPSCALE GAS 558	558	559	.10	557	-.10	-.20

RUN NO. 6 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.29	.096	.47	.157	.06
UPSCALE GAS 166.1	166.1	167	.30	167	.30	0

RUN NO. 6 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.04	.20	.05	.25	.05
UPSCALE GAS 11.13	11.1	11.08	.15	11.07	-.20	-.05

RUN NO. 6 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.01	.04	.02	.08	.04
UPSCALE GAS 12.0	12.0	12.0	0	12.01	.04	.04

RUN NO. 6 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.76	.076	.87	.087	.011
UPSCALE GAS 322	322	323	.10	323	.10	0

SYSTEM CALIBRATION BIAS = (SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN) X 100



SPACK  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION unit I OPERATOR R. Howes

RUN NO. 7 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.30	.03	.35	.035	.005
UPSCALE GAS 558	558	557	-.10	559	.10	.20

RUN NO. 7 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.47	.157	.57	.19	.033
UPSCALE GAS 166.1	166.1	167	.30	165	.317	-.667

RUN NO. 7 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.05	.25	.05	.25	0
UPSCALE GAS 11.13	11.11	11.07	-.20	11.08	-.15	.05

RUN NO. 7 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	12.01	.04	12.0	0	-.04

RUN NO. 7 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.87	.087	1.0	.10	.013
UPSCALE GAS 322	322	323	.10	323	-.10	0

SYSTEM CALIBRATION BIAS = (SYSTEM CAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100



SPACE  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/STRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION unit I OPERATOR B. Howes

RUN NO. 8 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.35	.035	.12	.012	-.023
UPSCALE GAS 558	558	559	.110	558	0	-.10

RUN NO. 8 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.57	.19	.50	.167	-.023
UPSCALE GAS 166.1	166.1	165	.317	166	-.033	.333

RUN NO. 8 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.05	.25	.05	.25	0
UPSCALE GAS 11.3	11.11	11.08	-.15	11.07	-.20	-.05

RUN NO. 8 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	12.0	0	12.0	0	0

RUN NO. 8 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	1.0	.10	.59	.059	-.041
UPSCALE GAS 322	322	323	+.10	322	0	-.10

SYSTEM CALIBRATION BIAS = (SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN) X 100

SPACE  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE: 10-18-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR B. Howes

RUN NO. 9 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.12	.012	.11	.011	-.001
UPSCALE GAS 558	558	558	0	556	-.20	-.20

RUN NO. 9 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.50	.167	.33	.11	.056
UPSCALE GAS 166.1	166.1	166	-.033	166	-.033	0

RUN NO. 9 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.05	.25	.06	.30	.05
UPSCALE GAS 11.3	11.1	11.07	-.20	11.09	-.10	.10

RUN NO. 9 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	12.0	0	12.0	0	0

RUN NO. 9 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.59	.059	.68	.068	.009
UPSCALE GAS 322	322	322	0	322	0	0

SYSTEM CALIBRATION BIAS = (SYSTEM CAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100



STACK  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR R. Howes

RUN NO. / GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.11	.011	.41	.041	.03
UPSCALE GAS 558	558	556	-.20	556	-.20	0

RUN NO. / GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.33	.11	.37	.123	.013
UPSCALE GAS 166.1	166.1	166	-.033	167	.30	-.333

RUN NO. / GAS TYPE: CO2 SPAN: 0-200	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.06	.30	.06	.30	0
UPSCALE GAS 11.13	11.11	11.09	-.10	11.09	-.10	0

RUN NO. / GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	12.0	0	11.99	-.04	-.04

RUN NO. / GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.68	.068	.56	.056	-.012
UPSCALE GAS 322	322	322	0	323	.10	.10

SYSTEM CALIBRATION BIAS = (SYSTEM CAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100





SPACE  
DATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-10-00  
 SOURCE IDENTIFICATION UNIT I OPERATOR B. Howes

RUN NO. 11 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.41	.041	.10	.01	-.031
UPSCALE GAS 558	558	556	-.20	556	-.20	0

STOP  
→

RUN NO. 11 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.37	.123			
UPSCALE GAS 166.1	166.1	167	.30			

RUN NO. 11 GAS TYPE: CO2 SPAN: 0-200	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.06	.30	.06	.30	0
UPSCALE GAS 11.13	11.11	11.09	-.10	11.09	-.10	0

RUN NO. 11 GAS TYPE: O2 SPAN: 0-250	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	11.99	-.04	11.99	-.04	0

RUN NO. 11 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.56	.056	.46	.046	-.01
UPSCALE GAS 322	322	323	.10	322	0	-.10

SYSTEM CALIBRATION BIAS = (SYSTEMCAL RESPONSE - ANALYZER CAL RESPONSE / SPAN) X 100

DRIFT = (FINAL SYSTEM CAL RESPONSE - INITIAL CAL RESPONSE / SPAN) X 100



SPACK  
RATA

SYSTEM CALIBRATION BIAS AND DRIFT DATA

CLIENT SEA/SRPP PROJECT # 00-205 TEST DATE 10-18-00  
 SOURCE IDENTIFICATION unit I OPERATOR R. Howes

RUN NO. / 2 GAS TYPE: NOx SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.10	.01	.32	.032	.022
UPSCALE GAS 558	558	556	-1.20	556	-1.20	0

RUN NO. / 2 GAS TYPE: SO2 SPAN: 0-300	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0					
UPSCALE GAS 166.1	166.1					

RUN NO. / 2 GAS TYPE: CO2 SPAN: 0-20%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.06	.30	.06	.30	0
UPSCALE GAS 11.13	11.11	11.09	-1.0	11.09	-1.0	0

RUN NO. / 2 GAS TYPE: O2 SPAN: 0-25%	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.02	.08	.02	.08	0
UPSCALE GAS 12.0	12.0	11.99	-.04	11.99	-.04	0

RUN NO. / 2 GAS TYPE: CO SPAN: 0-1000	ANALYZER RESPONSE	INITIAL VALUE		FINAL VALUE		DRIFT % OF SPAN
		SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	SYSTEM RESPONSE	SYSTEM CAL BIAS % OF SPAN	
ZERO GAS 0	0	.46	.046	.54	.054	.008
UPSCALE GAS 322	322	322	0	322	0	0

SYSTEM CALIBRATION BIAS - (SYSTEM CAL RESPONSE - ANALYZER CAL. RESPONSE / SPAN) X 100

DRIFT - (FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE / SPAN) X 100



Plant Data Sheets

ST. JOHNS RIVER POWER PARK  
BOILER CONTROL ROOM DATA

UNIT # I

DATE 10-18-00

PARAMETER	UNITS	Readings (30 minute intervals)					
Person Recording Data		DS	DS	DS	DS	DS	DS
Time		0800	0830	0900	0930	1000	1030
Steam Flow	Lb/Hr x 10 <sup>3</sup>	4.4	4.4	4.6	4.7	4.6	4.6
Air Flow	%	71	72	73	73	73	74
Generator Load (Gross)	Megawatts	649	660	674	673	673	673
Boiler Thermal Demand	Megawatts	652	660	675	676	675	677
O2 Flue Gas	%	2.8	2.8	2.7	2.75	2.65	2.7
Fuel Flow	%	103	104	104	104	104	104
Coal Totalizer	Tons						
A		45	45	45	45	45	45
B		42	42	42	42	42	42
C		45	45	45	45	45	45
D		<del>45</del>	-	-	-	-	-
E		47	47	47	47	47	47
F		37	37	37	37	37	37
G		43	47	47	47	47	47

**ST. JOHNS RIVER POWER PARK  
BOILER CONTROL ROOM DATA**

UNIT # I

DATE 10.18.00

PARAMETER	UNITS	Readings (30 minute intervals)					
Person Recording Data		DS	DS	DS	DS	DS	DS
Time		1100	1130	1200	1230	1300	1330
Steam Flow	Lb/Hr x 10 <sup>3</sup>	4.6	4.6	4.6	4.6	4.6	4.6
Air Flow	%	74	74	74	74	74	75
Generator Load (Gross)	Megawatts	674	672	675	673	671	673
Boiler Thermal Demand	Megawatts	680	680	682	680	678	682
O2 Flue gas	%	2.65	2.68	2.72	2.65	2.5	2.6
Fuel Flow	%	104	104	104	104	104	104
Coal Totalizer	Tons						
A		45	45	45	45	45	45
B		42	42	42	42	42	42
C		45	45	45	45	45	45
D		—	—	—	—	—	—
E		47	47	47	47	47	47
F		37	37	37	37	37	37
G		47	47	47	47	47	47

**ST. JOHNS RIVER POWER PARK  
BOILER CONTROL ROOM DATA**

UNIT # I

DATE 10-18-00

PARAMETER	UNITS	Readings (30 minute intervals)					
Person Recording Data		DS	DS	DS	DS	DS	
Time		1400	1430	1500	1530	1600	1630
Steam Flow	Lb/Hr x 10 <sup>3</sup>	4.6	4.6	4.6	4.7	4.7	T
Air Flow	%	76	76	76	77	77	E
Generator Load (Gross)	Megawatts	679	678	674	675	680	S T
Boiler Thermal Demand	Megawatts	685	688	681	688	692	i b
O2 Flue gas	%	2.8	2.8	2.9	2.8	2.8	S
Fuel Flow	%	104	104	104	2.8	2.8	
Coal Totalizer	Tons						
A		45	45	45	45	45	C <sub>0</sub>
B		42	42	42	42	42	m
C		45	45	45	45	45	P
D		-	-	-	-	-	I
E		47	47	47	47	47	C T
F		37	37	37	37	37	E
G		47	47	47	47	47	

**ST. JOHNS RIVER POWER PARK  
FLUE GAS DESULFURIZATION  
OPERATIONAL PARAMETERS  
UNIT # 1**

Date: 10, 18, 00

Initials: JJA

HOUR	PACKING DIFFERENTIAL PRESSURE (Inches H2O column)		
	A	B	C
0000			
0100			
0200			
0300			
0400			
0500			
0600			
0700			
0800	5.2		5.4
0900	5.1		5.7
1000	5.1		5.6
1100	5.2		5.7
1200	5.1		5.6
1300	5.2		5.6
1400	5.2		5.7
1500	5.3		5.8
1600	5.3		5.8
1700			
1800			
1900			
2000			
2100			
2200			
2300			

Daily Water System Use: \_\_\_\_\_ (Total Gallons) / 1440 (min/day) = \_\_\_\_\_ GPM

COMMENTS: In = 1463 out 1552 08100  
 In = 1463 out 1586 1699

Gas Certification Sheets





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

**Assay Laboratory**

SCOTT SPECIALTY GASES  
1750 EAST CLUB BLVD  
DURHAM, NC 27704

P.O. No.: 17556  
Project No.: 12-38356-002

**Customer**

JEA 11201 NEW BERLIN ROAD

ATTEN OP DEPT BLDG1  
ST JOHNS RIVER POWER PARK  
PO BOX 4910  
JACKSONVILLE FL 32201-4910

**ANALYTICAL INFORMATION**

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards: Procedure #G1, September, 1997.

Cylinder Number: **AAL9543** Certification Date: 5/17/00 Exp. Date: 5/17/2002  
Cylinder Pressure\*\*\*: 2015 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON DIOXIDE	18.06 %	+/- 1%	Direct NIST and NMI
CARBON MONOXIDE	1,687.00 PPM	+/- 1%	Direct NIST and NMI
NITRIC OXIDE	875.6 PPM	+/- 1%	Direct NIST and NMI
SULFUR DIOXIDE *	3,045 PPM	+/- 1%	Direct NIST and NMI
NITROGEN - OXYGEN FREE	BALANCE		
TOTAL OXIDES OF NITROGEN	876.0 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.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

\* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1800	1/01/04	A9806	18.05 %	CARBON DIOXIDE
NTRM 2637	4/03/03	ALM023773	2547. PPM	CARBON MONOXIDE
NTRM1687	3/01/03	ALM009632	1000. PPM	NO/N2
NTRM1696	8/01/02	ALM057905	3131. PPM	SO2/N2

**INSTRUMENTATION**

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN GC-3400-0160-CO2	05/17/00	GC / TCD
VARIAN-3400-16804-CO	05/02/00	GC
FTIR System-8220-AA89400252	04/18/00	Scott Enhanced FTIR
FTIR System-8220-AA89400252	04/18/00	Scott Enhanced FTIR

**ANALYZER READINGS**

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

**First Triad Analysis**

**Second Triad Analysis**

**Calibration Curve**

**CARBON DIOXIDE**

Date 05/17/00 Response Unit: PCT  
Z1 = 0.0000 R1 = 941429 T1 = 943564  
R2 = 943276 Z2 = 0.0000 T2 = 940880  
Z3 = 0.0000 T3 = 944719 R3 = 942253  
Avg Concentration 18.06 %

Concentration = A + Bx + Cx2 + Dx3 - Ex4  
r = 0.999990 1800  
Constants: A = 0.000000  
B = 1.000000 C = 0.000000  
D = 0.000000 E = 0.000000

**CARBON MONOXIDE**

Date 05/09/00 Response Unit: PPM  
Z1 = 0.0000 R1 = 68819 T1 = 45415  
R2 = 68525 Z2 = 0.0000 T2 = 45665  
Z3 = 0.0000 T3 = 45595 R3 = 68462  
Avg Concentration 1694 PPM

Date 05/16/00 Response Unit: PPM  
Z1 = 0.0000 R1 = 68834 T1 = 45280  
R2 = 68675 Z2 = 0.0000 T2 = 45534  
Z3 = 0.0000 T3 = 45291 R3 = 68813  
Avg Concentration 1680 PPM

Concentration = A + Bx + Cx2 + Dx3 - Ex4  
r = 0.999990 2637  
Constants: A = 0.000000  
B = 1.000000 C = 0.000000  
D = 0.000000 E = 0.000000

**NITRIC OXIDE**

Date 05/09/00 Response Unit: PPM  
Z1 = 0.2318 R1 = 1000.4 T1 = 876.59  
R2 = 1000.3 Z2 = 0.4172 T2 = 875.64  
Z3 = 0.3187 T3 = 875.49 R3 = 999.27  
Avg Concentration 875.9 PPM

Date 05/16/00 Response Unit: PPM  
Z1 = 0.1548 R1 = 1000.5 T1 = 874.04  
R2 = 997.39 Z2 = 0.3364 T2 = 875.02  
Z3 = 0.5171 T3 = 877.09 R3 = 1002.1  
Avg Concentration 875.4 PPM

Concentration = A + Bx + Cx2 + Dx3 - Ex4  
r = 0.999990  
Constants: A = 0.000000  
B = 1.000000 C = 0.000000  
D = 0.000000 E = 0.000000



Scott Specialty Gases

1750 EAST CLUB BLVD, DURHAM, NC 27704

RATA CLASS

Dual-Analyzed Calibration Standard

Installed 8/17/00

Phone: 919-220-0803

Fax: 919-220-0803

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

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM, NC 27704

P.O. No.: 17556
Project No.: 12-38356-001

Customer

JEA 11201 NEW BERLIN ROAD
ATTEN OP DEPT BLDG 1
ST JOHNS RIVER POWER PARK
PO BOX 4910
JACKSONVILLE FL 32201-4910

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM046485 Certification Date: 5/17/00 Exp. Date: 5/17/2002
Cylinder Pressure\*\*\*: 2015 PSIG

Table with 4 columns: COMPONENT, CERTIFIED CONCENTRATION (Moles), ACCURACY\*\*, TRACEABILITY. Rows include CARBON DIOXIDE, CARBON MONOXIDE, NITRIC OXIDE, SULFUR DIOXIDE, NITROGEN - OXYGEN FREE, and TOTAL OXIDES OF NITROGEN.

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

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

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

\* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols

REFERENCE STANDARD

Table with 5 columns: TYPE/SRM NO., EXPIRATION DATE, CYLINDER NUMBER, CONCENTRATION, COMPONENT. Rows include NTRM 1800, NTRM 2637, NTRM1687, NTRM1696.

INSTRUMENTATION

Table with 3 columns: INSTRUMENT/MODEL/SERIAL#, DATE LAST CALIBRATED, ANALYTICAL PRINCIPLE. Rows include VARIAN GC:3400/0160-CO2, VARIAN/3400/16804-CO, FTIR System/8220/AAB9400252.

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON DIOXIDE

Date: 05/17/00 Response Unit: PCT
Z1 = 0.0000 R1 = 941429 T1 = 580923
R2 = 943276 Z2 = 0.0000 T2 = 579935
Z3 = 0.0000 T3 = 582550 R3 = 942253
Avg Concentration: 11.13 %

Concentration = A + Bx + Cx2 + Dx3 - Ex4
r = 0.999990 1800
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

CARBON MONOXIDE

Date: 05/09/00 Response Unit: PPM
Z1 = 0.0000 R1 = 68819 T1 = 28974.
R2 = 68525. Z2 = 0.0000 T2 = 28804.
Z3 = 0.0000 T3 = 28857. R3 = 68462.
Avg Concentration 1072 PPM

Date: 05/17/00 Response Unit: PPM
Z1 = 0.0000 R1 = 68252. T1 = 29099.
R2 = 68287. Z2 = 0.0000 T2 = 29169.
Z3 = 0.0000 T3 = 29159. R3 = 68399.
Avg Concentration: 1087. PPM

Concentration = A + Bx + Cx2 + Dx3 - Ex4
r = 0.999990 2637
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

NITRIC OXIDE

Date: 05/09/00 Response Unit: PPM
Z1 = 0.2318 R1 = 1000.4 T1 = 558.96
R2 = 1000.3 Z2 = 0.4172 T2 = 558.30
Z3 = 0.3187 T3 = 558.31 R3 = 999.27
Avg Concentration 558.5 PPM

Date: 05/16/00 Response Unit: PPM
Z1 = 0.1548 R1 = 1000.5 T1 = 557.85
R2 = 997.39 Z2 = 0.3364 T2 = 556.90
Z3 = 0.5171 T3 = 557.93 R3 = 1002.1
Avg Concentration 557.6 PPM

Concentration = A + Bx + Cx2 + Dx3 - Ex4
r = 0.999990
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

For Technical Information Call  
1-800-752-1597



Air Products and Chemicals, Inc. • 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

# CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:  
AIR PRODUCTS AND CHEMICALS  
9725 ALDEN ROAD  
LENEXA KS 66215

Order No: CSS-316538-01  
Batch No: 861-64006  
PO:  
Release:

Cylinder No: SG9114792BAL  
Bar Code No: DYE635  
Cylinder Pressure\*: 2000 psig  
Certification Date: 11/04/1999  
Expiration Date: 11/04/2001

5078

RATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
SULFUR DIOXIDE	247 ±1.4 PPM	SG9150563BAL	NTRM 81661X	368.8 PPM	HORIBA VIA-510	85079208	10/18/99	NON DISPERSIVE INFRARED

NITROGEN Balance Gas

\* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

63

Analyst:

Bryan Baker

Approved By:

Richard Fry



# Scott Specialty Gases

1750 EAST CLUB BLVD, DURHAM, NC 27704

## RATA CLASS

Dual-Analyzed Calibration Standard

Phone: 919-220-0803

Fax: 919-220-0808

### CERTIFICATE OF ACCURACY: Interference Free <sup>TM</sup> EPA Protocol Gas

#### Assay Laboratory

SCOTT SPECIALTY GASES  
1750 EAST CLUB BLVD  
DURHAM, NC 27704

P.O. No.: PO 6893  
Project No: 12-33764-002

#### Customer

ST JOHNS RIVER POWER PARK  
OPERATIONS DEPT BLDG 1  
11201 NEW BERLIN RD  
JACKSONVILLE FL 32226

#### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL021741 Certification Date: 4/27/99 Exp. Date: 4/27/2001  
Cylinder Pressure\*\*\*: 1958 PSIG

#### COMPONENT

SULFUR DIOXIDE \*  
NITROGEN

#### CERTIFIED CONCENTRATION (Moles)

166.1 PPM  
BALANCE

#### ANALYTICAL

#### ACCURACY\*\*

+/- 1%

#### TRACEABILITY

Direct NIST and NMI

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

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

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

\* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

#### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM1661	10/02/02	ALM061003	488.5 PPM	SO2/N2

#### INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#  
FTIR System/8220/AAB9400252

DATE LAST CALIBRATED  
04/16/99

ANALYTICAL PRINCIPLE  
Scott Enhanced FTIR

#### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

#### SULFUR DIOXIDE \*

Date: 04/20/99	Response Unit: PPM		
Z1 = 0.2549	R1 = 488.27	T1 = 166.19	
R2 = 488.55	Z2 = 0.4108	T2 = 165.87	
Z3 = 0.4137	T3 = 166.09	R3 = 488.68	
Avg. Concentration:	166.0	PPM	

Date: 04/27/99	Response Unit: PPM		
Z1 = 0.5466	R1 = 487.93	T1 = 166.32	
R2 = 488.85	Z2 = 0.6361	T2 = 166.09	
Z3 = 0.6424	T3 = 166.14	R3 = 488.71	
Avg. Concentration:	166.2	PPM	

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999990	
Constants:	A = 0.000000
B = 1.000000	C = 0.000000
D = 0.000000	E = 0.000000

APPROVED BY:

*B.M. Becton*

B.M. Becton

G4

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For Technical Information Call  
1-800-752-1597



Air Products and Chemicals, Inc. • Rural Route #1, Tamaqua, PA 18252

ISO CERTIFICATION: 9002

# CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:  
AIR PRODUCTS AND CHEMICALS  
9725 ALDEN ROAD  
LENEXA KS 66215

Order No: CSS-249609-01  
Batch No: 255-4996E  
FO:  
Release:

Cylinder No: SG9173770BAL  
Bar Code No: DTT184  
Cylinder Pressure\*: 2000 psig  
Certification Date: 08/09/1999  
Expiration Date: 08/09/2002

## 5069

CERTIFIED CONCENTRATION		REFERENCE STANDARDS				ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal	
CARBON DIOXIDE	18.12.04 %	SG9169557BAL	NTRM 81675X	10.82 %	Shimadzu Model	C1049300	08/05/99	GC-TCD	
OXYGEN	22.12.07 %	SG9168291BAL	NTRM 82658X	16.04 %	SHIMADZU GC-8A	59405U	08/05/99	GC-TCD	

NITROGEN Balance Gas

\* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

CS

Analyst:

Michael Koval

Michael Koval

Approved By:

Bruce Andersen

Bruce Andersen

For Technical Information Call  
1-800-752-1597



Air Products and Chemicals, Inc. \* 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

# CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

**Customer:**  
AIR PRODUCTS AND CHEMICALS  
9725 ALDEN ROAD  
LENEXA KS 66215

**Order No:** CSS-5066:1-01  
**Batch No:** 861-71965  
**PO:**  
**Release:**

**Cylinder No:** SG900075  
**Bar Code No:** FAF059  
**Cylinder Pressure\*:** 2000 psig  
**Certification Date:** 07/26/2000  
**Expiration Date:** 07/26/2003

**5088**

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON DIOXIDE	9.82 ± 0.065 %	SG91630928AL	NTRM 81674X	8.918 %	Horiba VIA-510	51135063	07/10/00	NON DISPERSIVE INFRARED
OXYGEN	12.0 ± 0.059 %	SG909740ALB	NTRM	16.04 %	SERVOMEX 1100	2974C	07/12/00	PARAMAGNETIC

NITROGEN

Balance Gas

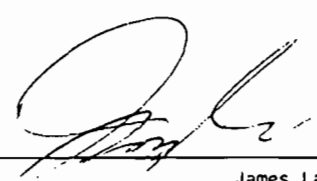
\* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

GG

Analyst:

  
Abbasi Husain

Approved By:

  
James Laas

AIR PRODUCTS AND CHEMICALS, INC.  
 SPECIALTY GAS DEPARTMENT  
 1222 S. MERTWORTH AVENUE  
 CHICAGO, IL 60628  
 TELEPHONE (773) 785-3000  
 FAX (312) 785-3008

DATE: 07/14/00  
 TIME: 11:46  
 PAGE: 1

\*\*\*\*\*  
 \* CERTIFICATE OF ANALYSIS \*  
 \*\*\*\*\*

AIR PRODUCTS AND CHEMICALS  
 9725 ALDEN ROAD  
 LENEXA KS 66215

CUSTOMER ACCOUNT : A1454  
 CUSTOMER ORDER NO :  
 CUST ORD LINE/REL :  
 ORDER NO : CSS-485840-01  
 SHIPPER NUMBER : 861-C-5786A

REF: KIRK WELDING GASES (CYLINDERS)\*\*

**5085**

Since with our internal work instruction A-3,  
 below are traceable to NIST.

CERTIFIED GAS MIXTURE: NITROGEN DIOXIDE IN AIR (90-999PPM)

BAR CODE	CYLINDER NO	VOLUME	COMPONENT REQUESTED	CAS NUMBER	CONCENTRATION REQUESTED	ANALYTICAL		LAB MET
						ANALYTICAL RESULT	ACCURACY (+/-) MEASURE	
BATCH NO. 861-70985		Analysis Date 06/21/00		Chicago Spec Gas				
DYE460	809134679	141.00 CF	NITROGEN DIOXIDE AIR	10102-44-0	125	125	2X MOLAR PPM	30
						Balance		

LIST OF LAB METHODS USED :  
 30 FTIR

**CERTIFICATION**

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL METHOD(S) AND IS CORRECT TO WITHIN THE ANALYTICAL ACCURACIES OF THIS (THESE) METHOD(S).

*J. Laas / ps*  
 \_\_\_\_\_  
 AUTHORIZED SIGNATURE

RPCI CHICAGO FAX: 1-773-785-1928 Jul 14 '00 11:07 P.02

Calibration of Test Equipment



9-27-00

### NO<sub>2</sub> to No<sub>x</sub> Conversion Efficiency

ALTERNATIVE PROCEDURE TO CHECK NO<sub>2</sub> TO NO CONVERTER EFFICIENCY - APPLIES TO BOTH METHODS 7E AND 20.

As noted in Section 5.6.2 of Method 20, alternative procedures may be acceptable.

An acceptable alternative to the Section 5.6.1 procedure of Method 20 for checking NO<sub>2</sub> to NO converter efficiency can be the use of a cylinder of NO<sub>2</sub> in N<sub>2</sub> calibration gas. As compared to the Tedlar bag procedure in Section 5.6.1 of Method 20, the use of NO<sub>2</sub> cylinder gas can provide a direct measurement of converter efficiency.

To be acceptable, the cylinder gas procedure must use NIST/EPA approved certified reference material; standard reference material or Protocol 1 calibration gases certified by the vendor to be within two percent (2%) of the tag value. The concentration of NO<sub>2</sub> is to be between 40 and 60 PPM.

Although Section 5.6.1 of Method 20 specifies that the tester is to '....attach the bag outlet to the calibration valve assembly and begin operation of the sampling system....', the Tedlar bag procedure is only intended to performance check the NO<sub>2</sub> to NO converter itself, and not the entire assembly No<sub>x</sub> measurement system, or any other portion thereof, such as the moisture removal system. Substitution of the NO<sub>2</sub> cylinder gas procedure will still only check the efficiency of the converter. Consequently, it is now found acceptable for the tester to introduce either the NO<sub>2</sub> in N<sub>2</sub> gas or the gas prepared as described in Section 5.6.1 of Method 20 at any point upstream of the NO<sub>2</sub> to N<sub>2</sub> converter, including the injection port at the back of the monitor.

The tester is to direct the NO<sub>2</sub> in N<sub>2</sub> gas to the NO<sub>x</sub> analyzer (operating in the NO<sub>x</sub> mode) until the concentration reading stabilizes. Then, the tester records the instrument response, and calculates the converter efficiency. If the instrument response indicates at least 90 percent NO<sub>2</sub> to NO conversion, the converter is acceptable. If the instrument response indicates less 90 percent NO<sub>2</sub> to NO conversion, the converter is unacceptable, and repair or replacement is required before repeating the check.

### NO<sub>2</sub> to No<sub>x</sub> Conversion Efficiency

Date: 9-27-00

Taken By: R. Howes

NO<sub>x</sub> Value Read  
NO<sub>2</sub> Value of Tank x 100 = Conversion Efficiency

$$119.33 / 125 * 100 = \underset{C1}{95.47\%}$$

NO2 TO NO CONVERSION EFFICIENCY

ANALYZER NOX model 10 PERFORMED BY R. Howes  
 SERIAL # 10 AR 28640-232 DATE 9-27-00  
 NO2 GAS VALUE 125 CYLINDER NUMBER SG9134679

0-250 scale

SPAN	CYLINDER NO	CYLINDER VALUE	ANALYZER RESPONSE	ABSOLUTE DIFFERENCE	DIFFERENCE % OF SPAN
ZERO GAS		0	.02	.02	0.01%
MID GAS	SG9154074	128	128.32	.32	0.13%
HIGH GAS	SG9136334	222	223.25	1.25	0.50%

CONVERSION DATA

START TIME	NOX PPM	NO2 TANK VALUE	ABSOLUTE DIFFERENCE
11:19	117.08	125	-7.92
11:20	119.72		-5.28
11:21	119.90		-5.10
11:22	119.70		-5.30
11:23	120.26	↓	-4.74
AVERAGE	119.33	125	-5.67

(NOX VALUE READ / NO2 VALUE OF TANK) X 100 = CONVERSION EFFICIENCY

$(119.33 / 125) \times 100 = 95.47\%$  EFFICIENT

Client : shop  
Site :  
Unit :  
Project : 00-000  
Test Date : 9/27/00

Time : 11:15 thru 11:29

1032

NOX

Time PPM

1:15:02 -0.01

1:16:02 0.02

1:17:02 223.25

1:18:02 128.32

1:19:02 117.08

1:20:02 119.72

1:21:02 119.90

1:22:02 119.70

1:23:01 120.26

1:24:01 120.85

1:25:01 0.27

1:26:01 -0.13

1:27:01 222.71

1:28:01 128.23

*- Initial zero Reading*

*- High Cal Gas = 222 ppm*

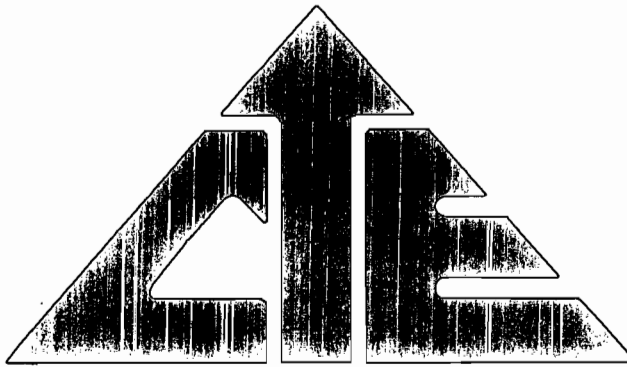
*- Mid Cal Gas = 128 ppm*

*} NOX Conversion Cal Gas = 125 ppm  
Avg = 119.33*

*- Final zero Reading*

*- High Cal Gas = 222 ppm*

*- Mid Cal Gas = 128 ppm*



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