PA 87-25

TECO POWER SERVICES HARDEE POWER PARTNERS

Via Certified Mail – 7000 0520 0016 1537 6038

January 17, 2001

Mr. Bill Proses
Florida Department of Environmental Protection (FDEP)
Southwest District Office
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Re: Hardee Power Partners (HPP)
Hardee Power Station (HPS)
Title V Air Operation Permit No. 0490015-001-AV
PSD Permit No. PSD-FL-140A
Revised Annual Emission Test Report for Unit CT2B

Mr. Proses:

Pursuant to Title V Air Operation Permit No. 0490015-001-AV, Provisions G.8 (a) and R.1, and PSD Permit No. PSD-FL-140A, Section III (40), HPP submitted an annual emissions compliance test report for the Hardee Power Station on November 22, 2000. Also on November 22, 2000, NOx data for Unit CT2B was submitted under a separate report to your office in the Continuous Emissions Monitoring System (CEMS) 2000 Relative Accuracy Test Audit (RATA) Report.

After a discussion between you and Mr. Paul Carpinone and Mr. Frank Sarduy, of TECO Power Services, it was agreed to revise the Unit CT2B Source Emissions Test Report to include the NOx data as well. HPP hereby submits a copy of this report.

Also, please note that Units CT2A and CT2B were tested on natural gas only because they were run for 400 hours or less on No. 2 fuel oil in the preceding 12-month period.

Please call me at (813) 228-1381 or Paul Carpinone at (813) 228-4858 if you have any questions regarding this matter.

I certify that, based on the information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Sincerely,

John T. Duff
Vice President – Power Operations

Cc: Howard Rhodes – FDEP – Tallahassee
H. Oven, FDEP – Tallahassee

HARDEE POWER PARTNERS, LTD.
P. O. BOX 111 TAMPA, FL 33601-0111
AN EQUAL OPPORTUNITY COMPANY

(813) 228-1330
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HTTP://WWW.TECOPOWERSERVICES.COM

SOURCE EMISSIONS TEST REPORT

HARDEE POWER STATION

COMBUSTION TURBINE 2-B

OCTOBER 13, 2000

CARBON MONOXIDE, OXIDES of NITROGEN AND VISIBLE EMISSIONS

Prepared for:

Hardee Power Partners, Limited

Prepared by:

Tampa Electric Company

Environmental Affairs-Air Services

REPORT CERTIFICATION

I have reviewed the test performance, the resulting calculations, and contents of this report, and verified that all project quality objectives have been met.

Date 1/11/2001 Signature _____

Senior Environmental Technician
Quality Assurance/Quality Control Specialist
Air Services
Environmental Affairs
Tampa Electric Company

The sampling, analysis and calculations performed for this report were carried out under my direction, and I hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date 1/11/2001 Signature _____

Environmental Technician
Report Author
Air Services
Environmental Affairs
Tampa Electric Company

I have reviewed the testing details and results in this report, and hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date 1/11/01 Signature _____

Coordinator
Air Services
Environmental Affairs
Tampa Electric Company

TABLE OF CONTENTS

SECTION		PAGE NO.
1.0	SUMMARY OF RESULTS	1
2.0	SOURCE DESCRIPTION/TEST PROCEDURES	2
3.0	TEST RESULTS	6
	CARBON MONOXIDE and NITROGEN OXIDES RESULTS	7
4.0	FIGURES	8
	SAMPLING LOCATION DIAGRAM - FIGURE 1	9
	TCEM SAMPLING SYSTEM DIAGRAM - FIGURE 2	10

APPENDICES

A. SOURCE TEST CALCULATIONS
- A-1 CARBON MONOXIDE
- A-2 NITROGEN OXIDES

B. UNCORRECTED REFERENCE METHOD DATA

C. TURBINE OPERATIONAL DATA

D. FUEL ANALYSIS

E. V.E. DATA SHEETS

F. TCEMS CALIBRATION DATA
- F-1 TCEM SETUP
- F-2 INITIAL/FINAL TCEMS CALIBRATIONS
- F-3 SYSTEM BIAS TESTS
- F-4 SYSTEM BIAS AND DRIFT CALCULATIONS

G. CALIBRATION GAS CERTIFICATES OF ANALYSIS

H. TEST PARTICIPANTS

1.0 SUMMARY OF RESULTS

On October 13, 2000 the Environmental Affairs, Air Services Group of Tampa Electric Company, performed source emission tests on the Unit CT-2B, a 75 MW simple cycle combustion turbine unit at the Hardee Power Station of Hardee Power Partners. Testing was conducted simultaneously with a Relative Accuracy Test Audit (RATA). Each of the three separate compliance runs were comprised of 3 distinct tests, spanning 21 minutes in duration, representing a total test time of 63 minutes. Each of the 3 distinct tests was averaged to produce the compliance run data. The three compliance runs were then averaged to produce the concentration and/or emission rate for the compliance test. All testing was conducted according to requirements in FDEP permit # PSD-FL-140A.

Carbon Monoxide (CO) emissions were derived from 3 compliance runs using U.S. EPA Method 10. The calculated average of CO ppm @ 15% O_2 was 8.5 ppm and 16.2 lbs/hr. The FDEP allowable emission rate is 25.0 ppm @ 15% O_2 and 54.0 lbs/Hr.

Nitrogen Oxides (NOx) emissions were derived from 3 compliance runs using U.S. EPA Method Reference Method 20. Port "F" was chosen as the sampling point for Unit CT-2B, after traversing the stack to locate the lowest O_2 point. The calculated average NOx ppm @ 15% O2 was 6.4 ppm, and 20.2 lbs./hr. The FDEP allowable emission rate is 9.0 ppm @ 15% O2, and 32.0 lbs./hr.

A visible emission test was performed during the test period using FDEP Method 9. The average opacity observed during the 30 minute test was 0 percent. The FDEP allowable rate for natural gas is 10 percent.

During the tests on October 13, 2000 the turbine was operated at an average Heat Input rate of 850.2 MM Btu/Hr and an average load of 78 megawatts. The average fuel flow was 39,552 lbs per hour. Details of turbine operation are included in Appendix C.

2.0 SOURCE DESCRIPTION/TEST PROCEDURES

The Hardee Power Station, operated by Hardee Power Partners, Limited, is located near Fort Green Springs in Hardee County Florida at UTM coordinates East 404.8 North 3057.4. The source is a natural gas fired simple cycle combustion turbine with a nominal capacity of 78 MW. The emissions sampling location consists of a rectangular stack 19 x 9 feet with seven horizontal sample ports. Upstream and downstream gas flow disturbances were determined to be 1.99 and 3.69 stack diameters away from the test ports, respectively. A diagram of the stack sampling location is included in Figure 1 along with other pertinent information on the test site.

Carbon Monoxide sampling was performed according to U.S. EPA Method 10 - "Determination of Carbon Monoxide Emissions from Stationary Sources". Sampling was performed using the equipment depicted in Figure 2. Diluent gas sampling was performed according to U.S. EPA Method 3A - "Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources".

Fuel samples were obtained during the sampling period. Fuel analysis was performed by ASTM Procedures. A visible emission test was performed using Florida DEP Method 9.

TCEMS DESCRIPTION

The following discussion briefly outlines the operation principles of Air Services Transportable Continuous Emissions Monitoring System (TCEMS). Additional information on instrument operation may be found in the individual instrument manuals provided by the manufacturers. A schematic of the TCEMS set-up is presented in Figure 2.

Servomex Model 1400 B O_2 Analyzer

The Servomex 1400B oxygen analyzer measures the paramagnetic susceptibility of the sample gas by means of a magneto-dymanic type measuring cell.

Thermo Environmental Instruments Model 10A/R NO/NOx Analyzer

The Thermo Environmental Instruments model 10A/R NO/NO^x analyzer automatically and continuously determines the concentration of nitric oxide (NO) and/or oxides of nitrogen (NO_x) in a flowing gas mixture. The analytical technique is chemiluminescence.

To measure NO concentrations, the gas sample to be analyzed is blended with ozone (O_3) in a reaction chamber. The resulting chemiluminescence activity is monitored through an optical filter by a high sensitivity photomultiplier tube positioned at one end of the chamber.

This filter and photomultiplier combination responds to light a narrow wavelength band unique to the NO/O_3 reaction, producing an interference free signal. The output from the photomultiplier is linearly proportional to the NO concentration.

To measure NO_x concentrations (i.e., NO plus NO_2), the sample gas flow is diverted through a NO_2-to-NO converter. The chemiluminescent action in the reaction chamber to the converter effluent is linearly proportional to the NO_x concentration entering the converter.

Thermo Environmental Instruments Model 48-H Gas Filter Correlation CO Analyzer High Range

Gas Filter Correlation (GFC) spectroscopy is based upon comparison of the detailed structure of the infrared absorption spectrum of the measured gas to that of other gases also present in the sample being analyzed. The technique is implemented by using a high concentration sample of the measured gas, i.e., CO, as a filter for the infrared radiation transmitted through the analyzer, hence the term GFC.

Radiation from an IR source is chopped and then passed through a gas filter alternating between CO and N_2 due to rotation of the filter wheel. The radiation then passes through a narrow bandpass interference filter and enters a multiple optical pass cell where absorption by the sample gas occurs. The IR radiation then exits the sample cell and falls on an IR detector.

The CO gas filter acts to produce a reference beam which cannot be further attenuated by CO in the sample cell. The N_2 side of the filter wheel is transparent to the IR radiation and therefore produces a measurement beam which can be absorbed by CO in the cell. The chopped detector signal is modulated by the alternation between the two gas filters with an amplitude related to the concentration of CO in the sample cell. Other gases do not cause modulation of the detector signal since they absorb the reference and measure beams equally. Thus the GFC system responds specifically to CO.

Data Acquisition System

The data acquisition system (DAS) developed by Entropy Environmentalists Inc., uses a portable personal computer with a 20 megabyte hard disk and an internal 12 bit analog-to-digital converter with an external 16 channel multiplexer. In addition to providing an instantaneous display of analyzer responses, the DAS can average data, calculate emission rates, and document analyzer calibrations. The test results and calibrations are stored on the hard disk and printed on a dot matrix printer.

TCEMS Sample Handling System

The extractive monitors utilized in the TCEMS require that the effluent stream be conditioned to eliminate any possible interference (i.e., water vapor and particulate matter), before being transported and injected into each analyzer. Figure 2 depicts a schematic of the entire sample handling system. The major components of this system are listed below:

- Gas transport tubing
- Moisture removal system
- Sampling pump

Gas Transport Tubing

Two separate 1/4 inch O.D. Teflon tubes were used for the sample gas transport.

Moisture Removal System

The moisture removal system was comprised of an ice bath condenser, constructed of a 30-foot section of 3/8 inch O.D. Teflon tubing, wrapped in a 12-inch coil. Effluent travels through this coil and then passes, in series, through two stainless steel moisture traps where the condensate drops out and is removed via a condensate discharge pump. With the exception of the discharge pump, the entire assembly is chilled in a ice bath.

Sampling Pump

The Thomas Model 2107CE20-TFE pump is used to transport the effluent sample through the conditioning system to the analyzers. All internal parts of the pump that come into contact with the gas sample are constructed of 316 stainless steel or Teflon.

3.0 TEST RESULTS

MASS EMISSION RATE CALCULATIONS SUMMARY
HARDEE POWER STATION
UNIT 2B

13-Oct-00

	AVERAGE CO PPMVD	AVERAGE O2 %	CO @ 15% O2	CO DENSITY CONSTANT	FLOW DSCFH	E CO
Test 1	8.80	15.03	8.84	7.26E-08	2.674E+07	17.1
Test 2	8.75	15.03	8.79	7.26E-08	2.674E+07	17.0
Test 3	9.25	15.03	9.30	7.26E-08	2.674E+07	18.0
Run 1average			**8.979 ppm**			**17.35 lbs./hr.**
Test 4	8.79	15.02	8.82	7.26E-08	2.654E+07	16.9
Test 5	8.59	15.03	8.63	7.26E-08	2.654E+07	16.6
Test 6	7.78	15.01	7.79	7.26E-08	2.654E+07	15.0
Run 2 average			**8.416 ppm**			**16.17 lbs./hr.**
Test 7	7.63	15.02	7.66	7.26E-08	2.648E+07	14.7
Test 8	7.66	15.01	7.67	7.26E-08	2.648E+07	14.7
Test 9	8.56	15.01	8.57	7.26E-08	2.648E+07	16.5
Run 3 average			**7.968 ppm**			**15.29 lbs./hr.**
AVERAGE			**8.454 ppm**			**16.27 lbs./hr.**

MASS EMISSION RATE (IBS/HR) CALCULATION:
E-pollutant = CO, ppmvd * flow, dscf/hr. * molecular weight density factor, lbs./dscf

	AVERAGE NOx PPMVD	AVERAGE O2 %	NOx @ 15% O2	NOx DENSITY CONSTANT	FLOW DSCFH	E CO
Test 1	6.30	15.03	6.33	1.19E-07	2.674E+07	20.1
Test 2	6.50	15.03	6.53	1.19E-07	2.674E+07	20.8
Test 3	6.50	15.03	6.53	1.19E-07	2.674E+07	20.8
Run 1average			**6.466 ppm**			**20.54 lbs./hr.**
Test 4	6.40	15.02	6.42	1.19E-07	2.654E+07	20.3
Test 5	6.20	15.03	6.23	1.19E-07	2.654E+07	19.6
Test 6	6.20	15.01	6.21	1.19E-07	2.654E+07	19.6
Run 2 average			**6.288 ppm**			**19.86 lbs./hr.**
Test 7	6.50	15.02	6.52	1.19E-07	2.648E+07	20.6
Test 8	6.30	15.01	6.31	1.19E-07	2.648E+07	19.9
Test 9	6.40	15.01	6.41	1.19E-07	2.648E+07	20.2
Run 3 average			**6.415 ppm**			**20.23 lbs./hr.**
AVERAGE			**6.390 ppm**			**20.21 lbs./hr.**

MASS EMISSION RATE (IBS/HR) CALCULATION:
E-pollutant = NOx, ppmvd * flow, dscf/hr. * molecular weight density factor, lbs./dscf

4.0 FIGURES

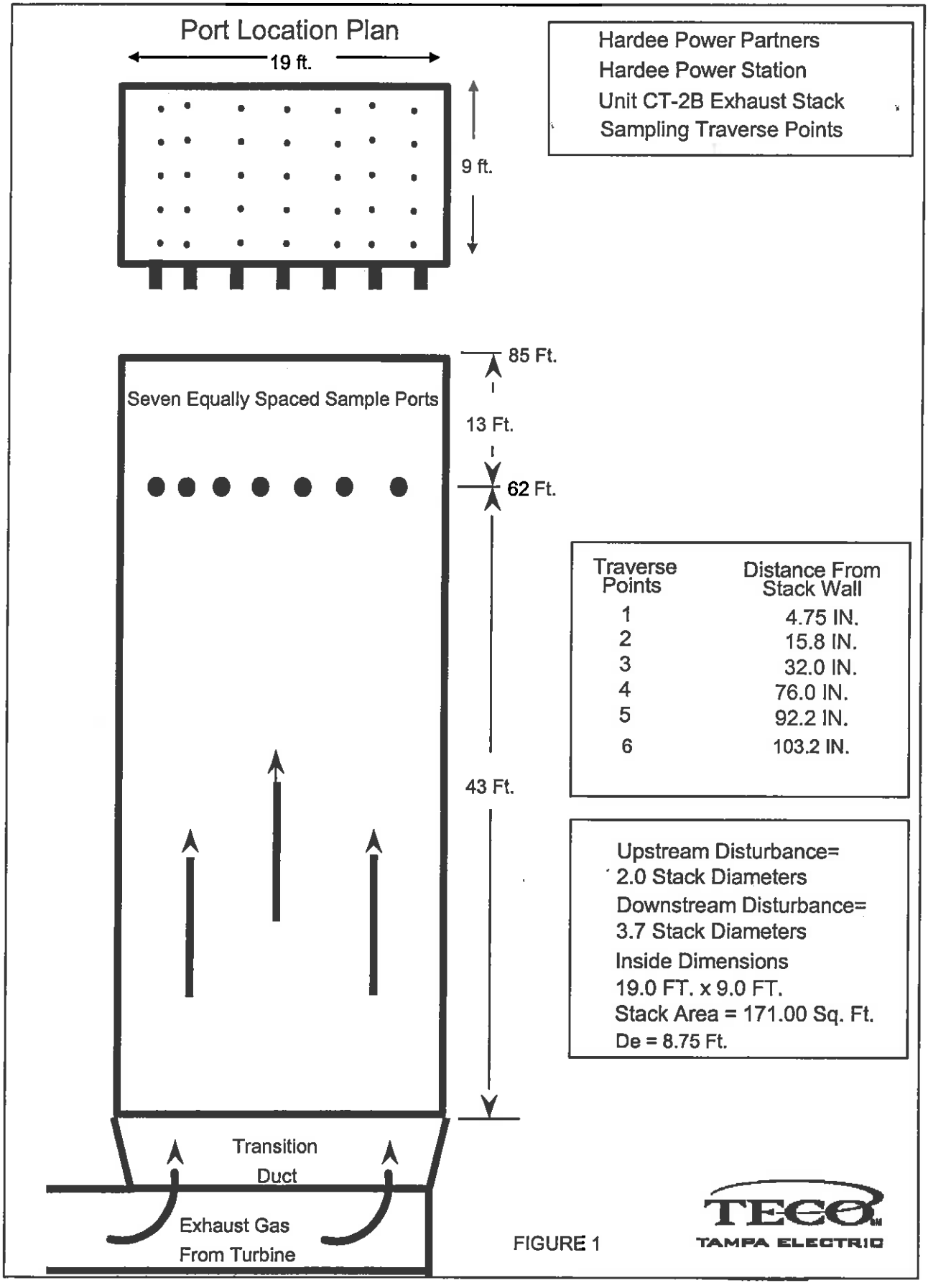
Port Location Plan
19 ft.
9 ft.
Hardee Power Partners
Hardee Power Station
Unit CT-2B Exhaust Stack
Sampling Traverse Points
85 Ft.
Seven Equally Spaced Sample Ports
13 Ft.
62 Ft.
Traverse Points
Distance From Stack Wall
1 4.75 IN.
2 15.8 IN.
3 32.0 IN.
4 76.0 IN.
5 92.2 IN.
6 103.2 IN.
43 Ft.
Upstream Disturbance=
2.0 Stack Diameters
Downstream Disturbance=
3.7 Stack Diameters
Inside Dimensions
19.0 FT. x 9.0 FT.
Stack Area = 171.00 Sq. Ft.
De = 8.75 Ft.
Transition Duct
Exhaust Gas From Turbine
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FIGURE 1

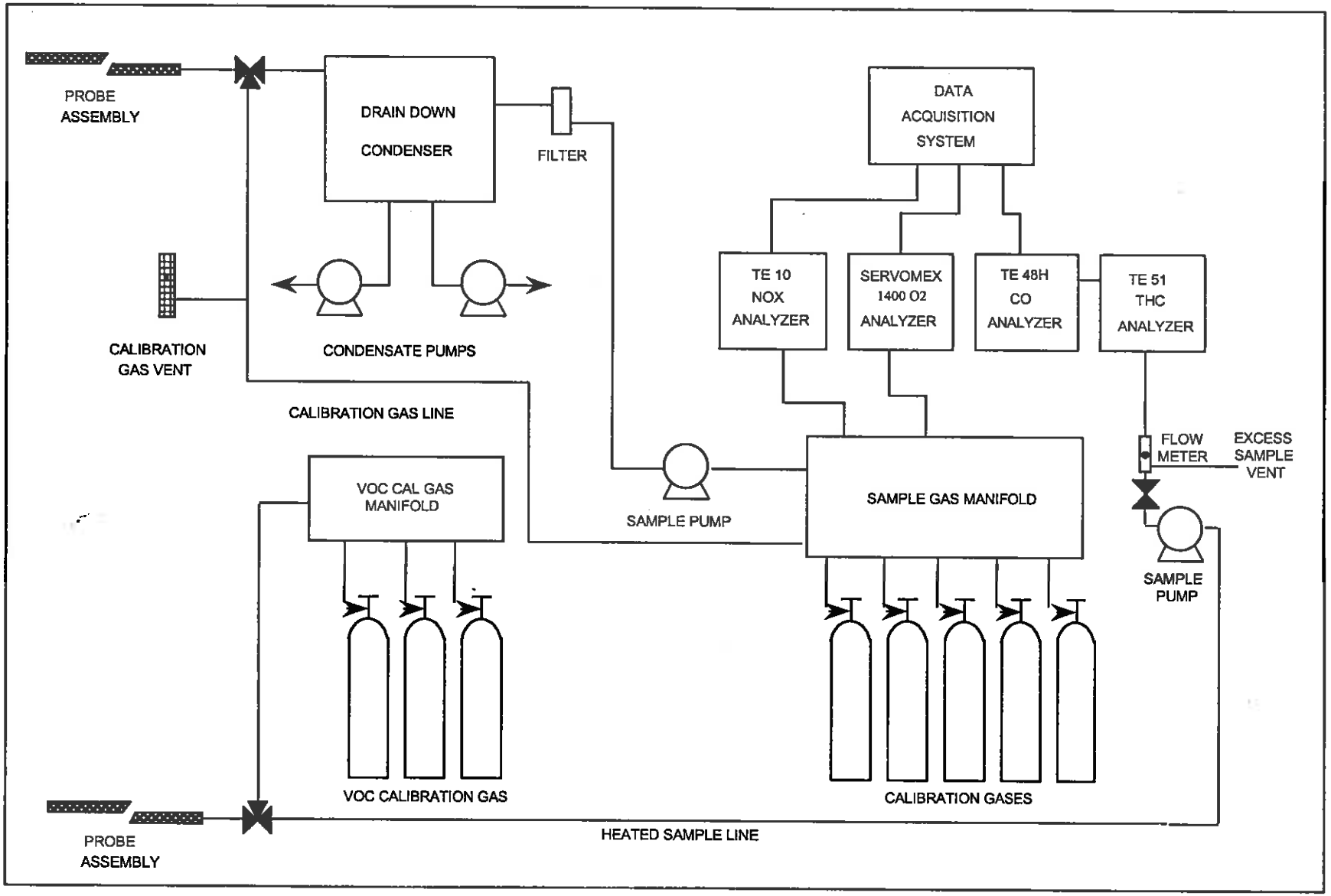

FIGURE 2
EXTRACTIVE SAMPLING TRAIN
USEPA METHOD 3A, 10, 20 and 25-A

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A. SOURCE TEST CALCULATIONS

A-1 CARBON MONOXIDE

A-2 NITROGEN OXIDES

A-1 CARBON MONOXIDE

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 1
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.00	0.10	0.05
	0.00 % O_2	0.03	0.05	0.04
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	12.00	12.00	12.00

Average CO recorded during run: 8.70 ppm CO
Average O_2 recorded during run: 15.02 % O_2

Corrected Concentration
8.80 ppm CO 15.03 % O_2

$$\text{Corrected Concentration} = \frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

$$\text{Concentration @ 15.0\% O2} = \text{ppm CO} \times \frac{5.9}{(20.9 - \%\ O_2)}$$

CO Concentration @ 15% O_2
8.84 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 1
Test Date: 10/13/2000

Corrected CO Concentration:	8.80 ppm CO
Corrected O_2 Concentration:	15.03 % O_2
CO Emission Rate:	17.091 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.67E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 2
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.10	0.00	0.05
	0.00 % O_2	0.05	0.02	0.04
Upscale	3.00 ppm CO	3.00	3.10	3.05
	12.00 % O_2	12.00	11.97	11.99

Average CO recorded during run: 8.80 ppm CO
Average O_2 recorded during run: 15.00 % O_2

Corrected Concentration
8.75 ppm CO 15.03 % O_2

Corrected Concentration = $\frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

Concentration @ 15.0% O2 = ppm CO x $\frac{5.9}{(20.9 - \% O_2)}$

CO Concentration @ 15% O_2
8.79 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 2
Test Date: 10/13/2000

Corrected CO Concentration:	8.75 ppm CO
Corrected O_2 Concentration:	15.03 % O_2
CO Emission Rate:	16.994 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.67E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 3
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.00	0.20	0.10
	0.00 % O_2	0.02	0.03	0.03
Upscale	3.00 ppm CO	3.10	3.00	3.05
	12.00 % O_2	11.97	12.01	11.99

Average CO recorded during run: 9.20 ppm CO
Average O_2 recorded during run: 15.01 % O_2

Corrected Concentration
9.25 ppm CO 15.03 % O_2

Corrected Concentration = $\frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

Concentration @ 15.0% O2 = ppm CO x $\frac{5.9}{(20.9 - \% O_2)}$

CO Concentration @ 15% O_2
9.30 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 3
Test Date: 10/13/2000

Corrected CO Concentration: 9.25 ppm CO

Corrected O_2 Concentration: 15.03 % O_2

CO Emission Rate: 17.965 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.67E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 4
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.20	0.10	0.15
	0.00 % O_2	0.03	0.03	0.03
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	12.01	11.97	11.99

Average CO recorded during run: 8.50 ppm CO
Average O_2 recorded during run: 15.00 % O_2

Corrected Concentration
8.79 ppm CO 15.02 % O_2

$$\text{Corrected Concentration} = \frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

$$\text{Concentration @ 15.0\% O2} = \text{ppm CO} \times \frac{5.9}{(20.9 - \%\ O_2)}$$

CO Concentration @ 15% O_2
8.82 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 4
Test Date: 10/13/2000

Corrected CO Concentration:	8.79 ppm CO
Corrected O_2 Concentration:	15.02 % O_2
CO Emission Rate:	16.944 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 5
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.10	0.00	0.05
	0.00 % O_2	0.03	0.03	0.03
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	11.97	12.00	11.99

Average CO recorded during run: 8.50 ppm CO
Average O_2 recorded during run: 15.00 % O_2

Corrected Concentration
8.59 ppm CO 15.03 % O_2

$$\text{Corrected Concentration} = \frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

$$\text{Concentration @ 15.0\% O2} = \text{ppm CO} \times \frac{5.9}{(20.9 - \%\ O_2)}$$

CO Concentration @ 15% O_2
8.63 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 5
Test Date: 10/13/2000

Corrected CO Concentration: 8.59 ppm CO

Corrected O_2 Concentration: 15.03 % O_2

CO Emission Rate: 16.558 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 6
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.00	0.10	0.05
	0.00 % O_2	0.03	0.04	0.04
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	12.00	11.98	11.99

Average CO recorded during run: 7.70 ppm CO
Average O_2 recorded during run: 14.99 % O_2

Corrected Concentration
7.78 ppm CO 15.01 % O_2

$$\text{Corrected Concentration} = \frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

$$\text{Concentration @ 15.0\% O2} = \text{ppm CO} \times \frac{5.9}{(20.9 - \%\ O_2)}$$

CO Concentration @ 15% O_2
7.79 ppm CO

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Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 6
Test Date: 10/13/2000

Corrected CO Concentration:	7.78 ppm CO
Corrected O_2 Concentration:	15.01 % O_2
CO Emission Rate:	14.997 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

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Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 7
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.10	0.20	0.15
	0.00 % O_2	0.04	0.04	0.04
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	11.98	11.99	11.99

Average CO recorded during run: 7.40 ppm CO
Average O_2 recorded during run: 14.99 % O_2

Corrected Concentration
7.63 ppm CO 15.02 % O_2

Corrected Concentration = $\frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$

where:

C_{ma} = upscale calibration gas concentration, ppm CO

C = average CO recorded during the run, ppm CO

C_0 = average zero calibration result, ppm CO

C_m = average upscale calibration result, ppm CO

Concentration @ 15.0% O2 = ppm CO x $\frac{5.9}{(20.9 - \% O_2)}$

CO Concentration @ 15% O_2
7.66 ppm CO

Environmental Affairs - Causeway
Air Services Group

TECO
TAMPA ELECTRIC

Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 7
Test Date: 10/13/2000

Corrected CO Concentration:	7.63 ppm CO
Corrected O_2 Concentration:	15.02 % O_2
CO Emission Rate:	14.674 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

TECO
TAMPA ELECTRIC

Environmental Affairs - Causeway
Air Services Group

Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 8
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.20	0.00	0.10
	0.00 % O_2	0.04	0.04	0.04
Upscale	3.00 ppm CO	3.00	3.00	3.00
	12.00 % O_2	11.99	12.00	12.00

Average CO recorded during run: 7.50 ppm CO
Average O_2 recorded during run: 14.99 % O_2

Corrected Concentration
7.66 ppm CO 15.01 % O_2

Corrected Concentration = $\frac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

Concentration @ 15.0% O2 = ppm CO x $\frac{5.9}{(20.9 - \% O_2)}$

CO Concentration @ 15% O_2
7.67 ppm CO

Environmental Affairs - Causeway
Air Services Group

TECO
TAMPA ELECTRIC

Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 8
Test Date: 10/13/2000

Corrected CO Concentration: 7.66 ppm CO

Corrected O_2 Concentration: 15.01 % O_2

CO Emission Rate: 14.732 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

TECO
TAMPA ELECTRIC

Environmental Affairs - Causeway
Air Services Group

Calcualtion of Average Carbon Monoxide Concentration

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 9
Test Date: 10/13/2000

	Calibration Gas Value	Initial Calibration	Final Calibration	Average Calibration
Zero	0.00 ppm CO	0.00	0.00	0.00
	0.00 % O_2	0.04	0.05	0.05
Upscale	3.00 ppm CO	3.00	3.10	3.05
	12.00 % O_2	12.00	11.99	12.00

Average CO recorded during run: 8.70 ppm CO
Average O_2 recorded during run: 14.99 % O_2

Corrected Concentration
8.56 ppm CO 15.01 % O_2

Corrected Concentration = $\dfrac{C_{ma} \times (C - C_0)}{(C_m - C_0)}$

where:

C_{ma} = upscale calibration gas concentration, ppm CO
C = average CO recorded during the run, ppm CO
C_0 = average zero calibration result, ppm CO
C_m = average upscale calibration result, ppm CO

Concentration @ 15.0% O2 = ppm CO x $\dfrac{5.9}{(20.9 - \%\ O_2)}$

CO Concentration @ 15% O_2
8.57 ppm CO

TECO
TAMPA ELECTRIC

Environmental Affairs - Causeway
Air Services Group

Calculation of Carbon Monoxide Emission Rate

Test Location: HARDEE POWER STATION UNIT 2B
Run Number: 9
Test Date: 10/13/2000

Corrected CO Concentration: 8.56 ppm CO

Corrected O_2 Concentration: 15.01 % O_2

CO Emission Rate: 16.463 lbs. CO/hr.

Emission Rate = $C_d \times C_f \times Q_d$

where:

C_d = Corrected CO concentration, ppm CO

C_f = Conversion factor ppm CO to lbs./scf CO = 7.263E-08 lbs. / scf

Qd = Average flow rate for test = 2.65E+07 dscf / hr.

A-2 NITROGEN OXIDES

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 1

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1141-1202

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.3	0.2	0.25
25.5 ppm NO_x	25.6	25.5	25.55
0.00 % O_2	0.03	0.05	0.04
12.00 % O_2	12	12	12.00

Average Reference Method Values:

6.5 ppm NO_x
15.02 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 1

6.3 ppm NO_x
15.03 % O_2

0.023 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 2

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1212-1233

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.2	0.2	0.20
25.5 ppm NO_x	25.5	25.7	25.6
0.00 % O_2	0.05	0.02	0.035
12.00 % O_2	12	11.97	11.985

Average Reference Method Values:

6.7 ppm NO_x
15 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 2
ERR ppm SO_2
6.5 ppm NO_x
15.03 % O_2
0.024 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 3

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1245-1306

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.2	0.3	0.25
25.5 ppm NO_x	25.7	25.6	25.65
0.00 % O_2	0.02	0.03	0.025
12.00 % O_2	11.97	12.01	11.99

Average Reference Method Values:

6.7 ppm NO_x
15.01 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 3

6.5 ppm NO_x
15.03 % O_2

0.024 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 4

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1317-1338

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.3	0.4	0.35
25.5 ppm NO_x	25.6	25.7	25.65
0.00 % O_2	0.03	0.03	0.03
12.00 % O_2	12.01	11.97	11.99

Average Reference Method Values:

6.7 ppm NO_x
15 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 4

6.4 ppm NO_x
15.02 % O_2

0.024 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 5

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1347-1408

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.4	0.6	0.50
25.5 ppm NO_x	25.7	25.7	25.7
0.00 % O_2	0.03	0.03	0.03
12.00 % O_2	11.97	12	11.985

Average Reference Method Values:

6.6 ppm NO_x
15 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 5

6.2 ppm NO_x
15.03 % O_2

0.023 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 6

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1418-1439

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.6	0.3	0.45
25.5 ppm NO_x	25.7	25.4	25.55
0.00 % O_2	0.03	0.04	0.035
12.00 % O_2	12	11.98	11.99

Average Reference Method Values:

6.6 ppm NO_x
14.99 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 6

6.2 ppm NO_x
15.01 % O_2

0.023 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 7

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1451-1512

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.3	0.5	0.40
25.5 ppm NO_x	25.4	25.7	25.55
0.00 % O_2	0.04	0.04	0.04
12.00 % O_2	11.98	11.99	11.985

Average Reference Method Values:

6.8 ppm NO_x
14.99 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 7

6.5 ppm NO_x
15.02 % O_2

0.024 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 8

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1523-1544

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.5	0.6	0.55
25.5 ppm NO_x	25.7	25.6	25.65
0.00 % O_2	0.04	0.04	0.04
12.00 % O_2	11.99	12	11.995

Average Reference Method Values:

6.8 ppm NO_x
14.99 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 8

6.3 ppm NO_x
15.01 % O_2

0.023 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

CALCULATION OF AVERAGE NO_x, AND O_2 EMISSIONS

Run Number: 9

Source Designation: HARDEE POWER STATION UNIT 2B

Test Date: 10/13/2000

Run Times: 1552-1613

Calibration Gas Value	Initial Cal Response	Final Cal Response	Mean Cal Response
0.0 ppm NO_x	0.6	0.5	0.55
25.5 ppm NO_x	25.6	25.5	25.55
0.00 % O_2	0.04	0.05	0.045
12.00 % O_2	12	11.99	11.995

Average Reference Method Values:

6.8 ppm NO_x
14.99 % O_2

CORRECTED REFERENCE METHOD VALUES

Run 9

6.4 ppm NO_x
15.01 % O_2

0.024 lbs. NO_x/MMBtu

Corrected Reference Method Values = $C_{ma}(C - C_o)/(C_m - C_o)$

Where:

C_{ma} = actual mid or upscale calibration gas concentration
C = average reference method value
C_o = mean zero calibration response
C_m = mean mid or upscale calibration gas response

and,

lbs. NO_x/MMBtu = (ppm NO_x)(F_d)(1.194E-07)(20.9/(20.9-%O_2)

where,

F_c = 8710

B. UNCORRECTED REFERENCE METHOD DATA

HARDEE POWER STATION UNIT 2B RATA 10-13-2000

TIME	CHAN 3 STACK %02	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%02	STACK ppmCO @15%02
23:42	15.02	8.7	6.5	6.5	8.7
23:43	15.03	8.8	6.4	6.5	8.8
23:44	15.03	9.1	6.4	6.5	9.2
23:45	15.03	8.8	6.5	6.5	8.8
23:46	15.03	8.3	6.5	6.5	8.3
23:47	15.02	8.6	6.5	6.6	8.6
23:48	15.03	8.6	6.5	6.5	8.7
23:49	15.02	8.8	6.5	6.5	8.8
23:50	15.02	8.4	6.6	6.6	8.5
23:51	15.02	8.6	6.5	6.5	8.6
23:52	15.02	8.8	6.5	6.5	8.8
23:53	15.02	8.5	6.5	6.5	8.6
23:54	15.02	8.6	6.5	6.5	8.6
23:55	15.02	8.7	6.4	6.5	8.7
23:56	15.02	8.8	6.5	6.5	8.8
23:57	15.02	8.7	6.5	6.5	8.8
23:58	15.02	8.7	6.5	6.5	8.8
23:59	15.02	8.6	6.5	6.5	8.6
24:00	15.02	8.6	6.5	6.5	8.6
00:01	15.02	8.4	6.5	6.5	8.5
00:02	15.02	8.7	6.4	6.4	8.8

11:42

12:02

AVERAGE VALUES FOR THE LAST 21 MINUTES

00:02	15.02	8.7	6.5	6.5	8.7

COMMENTS: END RUN ONE
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-13-2000

TIME	CHAN 3 STACK %O2	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%O2	STACK ppmCO @15%O2
12:13	14.99	9.0	6.4	6.4	9.0
12:14	14.99	8.5	6.5	6.5	8.5
12:15	15.00	8.6	6.5	6.5	8.6
12:16	15.00	8.9	6.7	6.7	8.9
12:17	15.00	8.4	6.7	6.7	8.4
12:18	15.00	8.5	6.8	6.8	8.5
12:19	15.01	8.6	6.7	6.8	8.6
12:20	15.01	8.4	6.8	6.8	8.4
12:21	15.01	8.8	6.8	6.8	8.8
12:22	15.01	8.8	6.7	6.7	8.8
12:23	15.01	8.9	6.7	6.7	8.9
12:24	15.01	8.7	6.7	6.7	8.7
12:25	15.01	8.5	6.8	6.8	8.5
12:26	15.00	8.5	6.8	6.8	8.5
12:27	15.00	8.6	6.7	6.7	8.7
12:28	15.01	8.9	6.8	6.8	8.9
12:29	15.01	9.0	6.8	6.9	9.0
12:30	15.01	9.0	6.9	6.9	9.0
12:31	15.01	9.2	6.9	6.9	9.2
12:32	15.01	9.2	6.9	6.9	9.2
12:33	15.01	9.1	6.8	6.9	9.1
AVERAGE VALUES FOR THE LAST 21 MINUTES					
12:33	15.00	8.8	6.7	6.7	8.8

COMMENTS: END RUN TWO
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-13-2000

TIME	CHAN 3 STACK %02	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%02	STACK ppmCO @15%02
12:46	14.99	9.0	6.5	6.5	9.0
12:47	15.00	8.9	6.6	6.6	8.9
12:48	15.00	9.2	6.6	6.6	9.2
12:49	15.00	9.2	6.7	6.7	9.2
12:50	15.00	9.0	6.6	6.7	9.0
12:51	15.01	9.4	6.6	6.6	9.4
12:52	15.01	9.0	6.7	6.7	9.1
12:53	15.01	9.2	6.6	6.6	9.2
12:54	15.01	9.2	6.6	6.6	9.3
12:55	15.01	8.9	6.7	6.7	8.9
12:56	15.01	9.0	6.6	6.6	9.0
12:57	15.01	9.2	6.7	6.7	9.2
12:58	15.02	9.5	6.7	6.7	9.5
12:59	15.01	9.4	6.8	6.8	9.4
13:00	15.01	9.3	6.8	6.8	9.3
13:01	15.01	9.4	6.8	6.8	9.4
13:02	15.01	9.2	6.8	6.8	9.3
13:03	15.01	9.2	6.8	6.8	9.2
13:04	15.01	9.2	6.9	6.9	9.2
13:05	15.01	8.8	7.0	7.0	8.8
13:06	15.01	8.8	6.9	6.9	8.8
AVERAGE VALUES FOR THE LAST 21 MINUTES					
13:06	15.01	9.2	6.7	6.7	9.2

COMMENTS: END RUN THREE
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-13-2000

TIME	CHAN 3 STACK %02	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%02	STACK ppmCO @15%02
13:48	14.99	8.1	6.5	6.5	8.1
13:49	14.99	7.7	6.4	6.4	7.7
13:50	14.99	7.9	6.5	6.5	7.9
13:51	15.00	7.8	6.5	6.5	7.8
13:52	15.00	7.9	6.5	6.5	7.9
13:53	14.99	7.8	6.6	6.5	7.8
13:54	15.00	8.1	6.6	6.6	8.1
13:55	15.00	7.9	6.6	6.6	7.9
13:56	15.00	8.0	6.6	6.6	8.0
13:57	15.00	7.8	6.7	6.7	7.8
13:58	15.00	8.1	6.7	6.7	8.1
13:59	15.00	7.9	6.8	6.8	7.9
14:00	15.00	8.0	6.8	6.8	8.0
14:01	15.00	7.8	6.8	6.8	7.8
14:02	15.00	8.0	6.7	6.7	8.0
14:03	15.00	7.8	6.7	6.7	7.8
14:04	15.00	8.0	6.7	6.7	8.0
14:05	15.00	7.8	6.7	6.7	7.8
14:06	15.00	8.1	6.7	6.7	8.1
14:07	15.00	7.9	6.6	6.6	7.9
14:08	15.00	7.8	6.7	6.7	7.8
AVERAGE VALUES FOR THE LAST 21 MINUTES					
14:08	15.00	7.9	6.6	6.6	7.9

COMMENTS: END RUN FIVE
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-~~14~~ 13-2000

TIME	CHAN 3 STACK %O2	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%O2	STACK ppmCO @15%O2
13:18	14.99	9.1	6.4	6.4	9.1
13:19	15.00	8.9	6.4	6.4	8.9
13:20	15.00	8.8	6.4	6.4	8.8
13:21	15.00	8.9	6.5	6.5	8.9
13:22	15.00	8.3	6.6	6.6	8.3
13:23	15.01	8.6	6.6	6.6	8.6
13:24	15.01	8.6	6.7	6.7	8.6
13:25	15.01	8.3	6.7	6.7	8.3
13:26	15.00	8.5	6.6	6.6	8.5
13:27	15.00	8.2	6.6	6.6	8.2
13:28	15.00	8.5	6.7	6.7	8.5
13:29	15.00	8.3	6.6	6.6	8.4
13:30	15.00	8.7	6.6	6.6	8.7
13:31	15.00	8.5	6.6	6.7	8.5
13:32	15.01	8.7	6.7	6.7	8.7
13:33	15.00	8.4	6.7	6.7	8.4
13:34	15.01	8.3	6.8	6.8	8.3
13:35	15.01	8.5	6.8	6.8	8.5
13:36	15.01	8.3	6.8	6.9	8.3
13:37	15.00	8.3	6.9	6.9	8.4
13:38	15.01	8.3	6.9	6.9	8.3
AVERAGE VALUES FOR THE LAST 21 MINUTES					
13:38	15.00	8.5	6.7	6.7	8.5

COMMENTS: END RUN FOUR
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-13-2000

TIME	CHAN 3 STACK %O2	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%O2	STACK ppmCO @15%O2
14:19	14.98	8.2	6.3	6.3	8.2
14:20	14.98	7.7	6.4	6.4	7.7
14:21	14.99	8.0	6.4	6.4	8.0
14:22	14.99	7.7	6.5	6.4	7.7
14:23	14.99	7.8	6.5	6.5	7.7
14:24	14.99	7.6	6.5	6.5	7.6
14:25	14.99	7.9	6.6	6.5	7.8
14:26	14.99	7.6	6.6	6.6	7.6
14:27	14.99	7.6	6.6	6.6	7.5
14:28	14.99	7.4	6.6	6.6	7.4
14:29	15.00	7.9	6.5	6.5	7.9
14:30	15.01	7.7	6.6	6.6	7.7
14:31	15.00	7.6	6.7	6.7	7.7
14:32	15.00	7.7	6.7	6.7	7.7
14:33	15.00	7.9	6.7	6.7	7.9
14:34	14.99	7.5	6.7	6.7	7.5
14:35	15.00	7.6	6.7	6.7	7.6
14:36	14.99	7.6	6.7	6.7	7.6
14:37	15.00	7.5	6.7	6.7	7.5
14:38	15.00	7.6	6.7	6.7	7.6
14:39	15.00	7.6	6.7	6.7	7.6
AVERAGE VALUES FOR THE LAST 21 MINUTES					
14:39	14.99	7.7	6.6	6.6	7.7

COMMENTS: END RUN SIX
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-~~14~~ 17 2000

TIME	CHAN 3 STACK %02	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%02	STACK ppmCO @15%02
14:52	14.97	7.6	6.9	6.9	7.6
14:53	14.97	7.4	6.9	6.8	7.4
14:54	14.98	7.2	6.9	6.9	7.1
14:55	14.98	7.3	6.8	6.8	7.3
14:56	14.98	7.3	6.8	6.8	7.3
14:57	14.98	6.9	6.8	6.8	6.9
14:58	14.98	7.4	6.8	6.8	7.4
14:59	14.98	7.0	6.8	6.8	7.0
15:00	14.98	7.4	6.8	6.8	7.3
15:01	14.99	7.2	6.8	6.8	7.2
15:02	14.99	7.5	6.8	6.8	7.5
15:03	14.99	7.5	6.8	6.8	7.5
15:04	14.99	7.8	6.8	6.8	7.7
15:05	14.99	7.7	6.8	6.8	7.7
15:06	14.99	7.6	6.8	6.8	7.6
15:07	14.99	7.5	6.9	6.9	7.5
15:08	14.99	7.4	6.9	6.9	7.4
15:09	14.99	7.3	6.9	6.9	7.3
15:10	15.00	7.5	6.8	6.8	7.5
15:11	15.00	7.5	6.8	6.8	7.5
15:12	15.00	7.7	6.8	6.8	7.7
AVERAGE VALUES FOR THE LAST 21 MINUTES					
15:12	14.99	7.4	6.8	6.8	7.4

COMMENTS: END RUN SEVEN
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-14-2000 (13)

TIME	CHAN 3 STACK %O2	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%O2	STACK ppmCO @15%O2
15:24	14.98	7.4	6.7	6.7	7.4
15:25	14.98	7.5	6.8	6.7	7.5
15:26	14.98	7.2	6.8	6.8	7.2
15:27	14.98	7.4	6.8	6.7	7.3
15:28	14.99	7.2	6.8	6.8	7.2
15:29	14.99	7.5	6.8	6.8	7.5
15:30	14.99	7.6	6.8	6.8	7.6
15:31	14.99	7.6	6.8	6.8	7.6
15:32	14.99	7.4	6.8	6.8	7.4
15:33	14.99	7.4	6.8	6.8	7.4
15:34	14.99	7.1	6.7	6.7	7.1
15:35	14.99	7.7	6.7	6.7	7.7
15:36	14.99	7.2	6.8	6.7	7.2
15:37	14.98	7.3	6.8	6.7	7.3
15:38	14.98	7.4	6.7	6.7	7.4
15:39	14.98	7.7	6.7	6.7	7.7
15:40	14.99	7.8	6.7	6.7	7.8
15:41	14.99	7.7	6.8	6.8	7.7
15:42	14.99	7.5	6.8	6.8	7.5
15:43	14.99	7.4	6.8	6.8	7.4
15:44	14.99	7.7	6.9	6.8	7.7
AVERAGE VALUES FOR THE LAST 21 MINUTES					
15:44	14.99	7.5	6.8	6.8	7.5

COMMENTS: END RUN EIGHT
UNIT 2B

HARDEE POWER STATION UNIT 2B RATA 10-~~14~~ 13-2000 no

TIME	CHAN 3 STACK %O2	CHAN 4 STACK ppmCO	CHAN 6 STACK ppmNOX	STACK ppmNOX @15%O2	STACK ppmCO @15%O2
15:53	14.97	8.0	6.8	6.7	7.9
15:54	14.97	8.3	6.7	6.7	8.2
15:55	14.98	8.2	6.7	6.7	8.1
15:56	14.98	8.1	6.7	6.7	8.1
15:57	14.98	8.5	6.7	6.7	8.4
15:58	14.98	8.2	6.7	6.7	8.2
15:59	14.98	8.3	6.8	6.7	8.3
16:00	14.99	8.3	6.7	6.7	8.3
16:01	14.99	8.2	6.7	6.7	8.2
16:02	14.98	8.0	6.7	6.7	8.0
16:03	14.99	8.1	6.7	6.7	8.1
16:04	14.99	8.2	6.7	6.7	8.2
16:05	14.99	7.9	6.8	6.7	7.9
16:06	14.99	7.7	6.8	6.7	7.7
16:07	14.99	8.0	6.8	6.7	7.9
16:08	14.99	7.8	6.8	6.8	7.8
16:09	14.99	7.8	6.8	6.8	7.8
16:10	15.00	8.3	6.8	6.8	8.3
16:11	14.99	7.9	6.8	6.8	7.9
16:12	14.99	8.0	6.8	6.8	8.0
16:13	14.99	7.7	6.8	6.8	7.6
AVERAGE VALUES FOR THE LAST 21 MINUTES					
16:13	14.99	8.1	6.8	6.7	8.0

COMMENTS: END RUN NINE
UNIT 2B

C. TURBINE OPERATIONAL DATA

Natural Gas Calculations of F-factors
Hardee Power Station Unit 2B
October 13, 2000

Component	% Volume	Molecular Weight	C Factor	H Factor	Fractional Weight	Weight Percents Carbon	Hydrogen	Nitrogen	Oxygen
Nitrogen	2.98	28.016	0	0	83.48768			4.902887	
Carbon Dioxide	0.78	44.01	0.272273	0	34.3278	0.548883			1.467047
Methane	92.2	16.041	0.75	0.25	1478.98	65.14081	21.7136		
Ethane	2.48	30.067	0.8	0.2	74.56616	3.503171	0.875793		
Propane	0.45	44.092	0.81818	0.18182	19.8414	0.953346	0.211857		
Isobutane	0.1	58.118	0.82759	0.17247	5.8118	0.282459	0.058865		
n-Butane	0.1	58.118	0.82759	0.17247	5.8118	0.282459	0.058865		
	99.09				1702.827	70.71113	22.91898	4.902887	1.467047
				O2 F-factor	**8800**	**DSCF/MMBtu**			

O2 F-factor = (((3.64*H)+(1.53*C)+(0.14*N)-(0.46*O))*10E6)/GCV(Btu/lb)

Qd = Flow rate, O2 F-factor (Qd)= Heat Input * O2-factor * 20.9 / (20.9-O2 actual)

CT 2-B	RUN 1	RUN 2	RUN 3
Average O2 for test	15.03	15.02	15.01
Heat Input (MMBtu/hr)	853.3	848.6	847.9
FO2	8800	8800	8800
Qd	2.674E+07	2.654E+07	2.648E+07

HEAT2B

Natural Gas Calculations of Density and Heating Values

Hardee Power Station

Unit 2B

Component	% Volume	Molecular Weight	Density (lb/ft3)	% volume x Density	Weight %	Component Gross Btu/lb	Weight Fraction Btu	Gross Heating Value (Btu/SCF)	Volume Fraction Btu
Oxygen	0.8	32.000	0.0846	0.0006768	1.47204	0	0	0	0
Nitrogen	2.98	28.016	0.0744	0.0022171	4.822237	0	0	0	0
Carbon Dioxide	0.78	44.01	0.117	0.0009126	1.984905	0	0	0	0
Methane	92.2	16.041	0.0424	0.0390928	85.02686	23879	20303.56	1013	933.986
Ethane	2.48	30.067	0.0803	0.0019914	4.331383	22320	966.7647	1792	44.4416
Propane	0.45	44.092	0.1196	0.0005382	1.170585	21661	253.5605	2590	11.655
Isobutane	0.1	58.118	0.1582	0.0001582	0.344085	21308	73.31765	3363	3.363
n-Butane	0.1	58.118	0.1582	0.0001582	0.344085	21257	73.14217	4016	4.016
Isopentane	0.03	72.144	0.1904	0.0000571	0.124236	21091	26.20262	4016	1.2048
n-Pentane	0.02	72.144	0.1904	0.0000381	0.082824	21052	17.43611	4016	0.8032
Hexanes Plus	0.06	86.169	0.2274	0.0001364	0.296757	20940	62.14093	4016	2.4096
Totals=	100 %								

Density	=	0.045977	Gross Heating Value	21776.13 Btu/lb
			Gross Heating Value (Btu/SCF)	1001.879

HARDEE POWER PARTNERS
HARDEE POWER STATION
UNIT NO. 2-B
13-Oct-00

CONVERSION: MASS FUEL FLOW (Natural Gas) TO VOLUMETRIC FUEL FLOW

	Run 1	Run 2	Run 3
Fuel Flow Rate, Fg, lbs./sec.	11.03	10.97	10.96
Fuel Density, Df, lbs./ft3	0.045977	0.045977	0.045977
Volumetric Fuel Flow, F, ft3/hr.	8.636E+05	8.590E+05	8.582E+05

CALCULATION OF HEAT INPUT

	Run 1	Run 2	Run 3
Heating Value of Natural Gas, Hg, BTU/ft3	988	988	988
Volumetric Fuel Flow, F, ft3/hr.	8.636E+05	8.590E+05	8.582E+05
Heat Input, HI, MMBtu/hr.	8.533E+08	8.486E+08	8.479E+08

CALCULATION NOTES

Volumetric Fuel Flow calculated as

$$F = (Fg / Df) \times 3600$$

Heat Input calculated as

$$HI = F \times Hg$$

Record#	DATE	TIME	NOX11	NOXHCOR12	NOXRT13
1	10/13/2000	114100	6.500	6.400	0.024
2	10/13/2000	114200	6.500	6.500	0.024
3	10/13/2000	114300	6.500	6.400	0.024
4	10/13/2000	114400	6.500	6.500	0.024
5	10/13/2000	114500	6.500	6.500	0.024
6	10/13/2000	114600	6.600	6.500	0.024
7	10/13/2000	114700	6.600	6.500	0.024
8	10/13/2000	114800	6.600	6.500	0.024
9	10/13/2000	114900	6.600	6.400	0.024
10	10/13/2000	115000	6.600	6.500	0.024
11	10/13/2000	115100	6.600	6.500	0.024
12	10/13/2000	115200	6.600	6.500	0.025
13	10/13/2000	115300	6.600	6.400	0.024
14	10/13/2000	115400	6.500	6.500	0.024
15	10/13/2000	115500	6.500	6.500	0.024
16	10/13/2000	115600	6.500	6.300	0.024
17	10/13/2000	115700	6.500	6.300	0.024
18	10/13/2000	115800	6.500	6.400	0.024
19	10/13/2000	115900	6.500	6.400	0.024
20	10/13/2000	120000	6.500	6.500	0.024
21	10/13/2000	120100	6.500	6.400	0.024
22	10/13/2000	120200	6.400	6.400	0.023
23	/ /				
24	/ /	AVE	6.532	6.445	0.024

Run 1

ecord#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	114100	14.930	78.620	11.086
2	10/13/2000	114200	15.030	77.980	11.002
3	10/13/2000	114300	14.980	78.100	11.002
4	10/13/2000	114400	14.960	78.520	11.077
5	10/13/2000	114500	15.020	78.700	11.071
6	10/13/2000	114600	14.990	78.470	11.101
7	10/13/2000	114700	15.000	78.470	11.097
8	10/13/2000	114800	15.010	78.740	11.082
9	10/13/2000	114900	14.930	78.990	11.112
10	10/13/2000	115000	14.970	78.770	11.109
11	10/13/2000	115100	14.970	78.300	11.077
12	10/13/2000	115200	14.970	78.790	11.090
13	10/13/2000	115300	14.960	78.450	11.021
14	10/13/2000	115400	14.960	78.050	10.988
15	10/13/2000	115500	15.020	78.310	11.015
16	10/13/2000	115600	14.940	78.190	11.034
17	10/13/2000	115700	14.950	78.230	11.048
18	10/13/2000	115800	14.960	78.120	11.070
19	10/13/2000	115900	14.990	78.410	11.073
20	10/13/2000	120000	14.990	78.140	11.055
21	10/13/2000	120100	15.010	78.110	11.035
22	10/13/2000	120200	14.940	78.420	11.038
23	/ /				
24	/ /	AVE	14.976	78.404	11.058

Record#	DATE	TIME	NOX11	NOXRT12	NOXHCOR13
1	10/13/2000	121200	5.200	0.020	5.400
2	10/13/2000	121300	6.100	0.022	6.000
3	10/13/2000	121400	6.600	0.024	6.400
4	10/13/2000	121500	6.600	0.024	6.400
5	10/13/2000	121600	6.700	0.024	6.500
6	10/13/2000	121700	6.600	0.024	6.500
7	10/13/2000	121800	6.700	0.024	6.600
8	10/13/2000	121900	6.700	0.024	6.600
9	10/13/2000	122000	6.600	0.024	6.400
10	10/13/2000	122100	6.700	0.024	6.400
11	10/13/2000	122200	6.600	0.024	6.400
12	10/13/2000	122300	6.600	0.024	6.400
13	10/13/2000	122400	6.600	0.024	6.400
14	10/13/2000	122500	6.600	0.024	6.300
15	10/13/2000	122600	6.600	0.024	6.400
16	10/13/2000	122700	6.600	0.024	6.400
17	10/13/2000	122800	6.500	0.023	6.200
18	10/13/2000	122900	6.500	0.023	6.300
19	10/13/2000	123000	6.500	0.023	6.300
20	10/13/2000	123100	6.500	0.023	6.300
21	10/13/2000	123200	6.500	0.023	6.300
22	10/13/2000	123300	6.500	0.023	6.400
23	/ /				
24	/ /	AVE	6.505	0.023	6.332

RUN 2

Record#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	121200	15.120	77.880	10.978
2	10/13/2000	121300	14.870	78.090	11.036
3	10/13/2000	121400	14.870	78.260	11.098
4	10/13/2000	121500	14.830	78.100	11.016
5	10/13/2000	121600	14.820	78.480	11.109
6	10/13/2000	121700	14.890	78.310	11.081
7	10/13/2000	121800	14.890	77.960	11.028
8	10/13/2000	121900	14.870	78.530	11.047
9	10/13/2000	122000	14.860	78.430	11.062
10	10/13/2000	122100	14.840	78.120	11.092
11	10/13/2000	122200	14.840	78.280	11.070
12	10/13/2000	122300	14.860	78.620	11.040
13	10/13/2000	122400	14.860	78.650	11.085
14	10/13/2000	122500	14.840	78.550	11.077
15	10/13/2000	122600	14.850	78.090	11.032
16	10/13/2000	122700	14.840	77.990	11.043
17	10/13/2000	122800	14.820	78.060	11.045
18	10/13/2000	122900	14.840	78.660	11.052
19	10/13/2000	123000	14.870	78.390	11.044
20	10/13/2000	123100	14.800	78.150	11.016
21	10/13/2000	123200	14.830	78.160	11.029
22	10/13/2000	123300	14.870	77.830	11.008
23	/ /				
24	/ /	AVE	14.863	78.254	11.049

Record#	DATE	TIME	NOX11	NOXRT12	NOXHCOR13
1	10/13/2000	124500	6.500	0.024	6.400
2	10/13/2000	124600	6.600	0.024	6.400
3	10/13/2000	124700	6.600	0.024	6.400
4	10/13/2000	124800	6.600	0.024	6.400
5	10/13/2000	124900	6.600	0.023	6.400
6	10/13/2000	125000	6.500	0.023	6.300
7	10/13/2000	125100	6.600	0.024	6.300
8	10/13/2000	125200	6.500	0.024	6.300
9	10/13/2000	125300	6.500	0.023	6.300
10	10/13/2000	125400	6.500	0.023	6.300
11	10/13/2000	125500	6.400	0.023	6.200
12	10/13/2000	125600	6.400	0.023	6.300
13	10/13/2000	125700	6.400	0.023	6.200
14	10/13/2000	125800	6.400	0.023	6.200
15	10/13/2000	125900	6.400	0.023	6.200
16	10/13/2000	130000	6.400	0.023	6.200
17	10/13/2000	130100	6.500	0.023	6.300
18	10/13/2000	130200	6.400	0.023	6.200
19	10/13/2000	130300	6.400	0.023	6.200
20	10/13/2000	130400	6.400	0.023	6.200
21	10/13/2000	130500	6.400	0.023	6.200
22	10/13/2000	130600	6.500	0.023	6.200
23	/ /				
24	/ /	AVE	6.477	0.023	6.277

:cord#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	124500	14.860	77.940	10.991
2	10/13/2000	124600	14.850	77.700	11.016
3	10/13/2000	124700	14.860	77.780	10.925
4	10/13/2000	124800	14.870	77.660	10.972
5	10/13/2000	124900	14.870	77.700	10.965
6	10/13/2000	125000	14.810	77.680	11.000
7	10/13/2000	125100	14.880	77.700	11.001
8	10/13/2000	125200	14.860	77.540	10.972
9	10/13/2000	125300	14.870	77.730	10.968
10	10/13/2000	125400	14.870	77.740	10.936
11	10/13/2000	125500	14.850	77.310	10.960
12	10/13/2000	125600	14.910	77.060	10.898
13	10/13/2000	125700	14.870	77.390	11.003
14	10/13/2000	125800	14.850	77.490	10.965
15	10/13/2000	125900	14.840	77.680	11.037
16	10/13/2000	130000	14.830	78.060	11.002
17	10/13/2000	130100	14.870	78.080	10.998
18	10/13/2000	130200	14.840	77.930	11.007
19	10/13/2000	130300	14.820	77.900	11.016
20	10/13/2000	130400	14.880	77.710	11.000
21	10/13/2000	130500	14.830	78.000	10.981
22	10/13/2000	130600	14.810	78.290	11.024
23	/ /				
24	/ /	AVE	14.855	77.730	10.984

:cord#	DATE	TIME	NOX11	NOXRT12	NOXHCOR13
1	10/13/2000	131700	6.500	0.023	6.300
2	10/13/2000	131800	6.500	0.023	6.300
3	10/13/2000	131900	6.600	0.023	6.300
4	10/13/2000	132000	6.600	0.024	6.400
5	10/13/2000	132100	6.500	0.024	6.400
6	10/13/2000	132200	6.600	0.024	6.400
7	10/13/2000	132300	6.600	0.024	6.400
8	10/13/2000	132400	6.500	0.023	6.300
9	10/13/2000	132500	6.600	0.024	6.300
10	10/13/2000	132600	6.600	0.024	6.400
11	10/13/2000	132700	6.600	0.024	6.400
12	10/13/2000	132800	6.600	0.024	6.400
13	10/13/2000	132900	6.600	0.023	6.400
14	10/13/2000	133000	6.600	0.023	6.300
15	10/13/2000	133100	6.500	0.024	6.400
16	10/13/2000	133200	6.500	0.023	6.300
17	10/13/2000	133300	6.500	0.023	6.200
18	10/13/2000	133400	6.400	0.023	6.200
19	10/13/2000	133500	6.500	0.023	6.200
20	10/13/2000	133600	6.500	0.023	6.300
21	10/13/2000	133700	6.500	0.023	6.300
22	10/13/2000	133800	6.500	0.023	6.400
23	/ /				
24	/ /	AVE	6.541	0.023	6.332

Run 4

ecord#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	131700	14.840	77.280	10.911
2	10/13/2000	131800	14.820	77.560	10.978
3	10/13/2000	131900	14.820	77.460	11.005
4	10/13/2000	132000	14.910	77.500	10.983
5	10/13/2000	132100	14.870	77.520	10.974
6	10/13/2000	132200	14.860	77.230	10.928
7	10/13/2000	132300	14.900	77.460	10.937
8	10/13/2000	132400	14.860	77.390	10.935
9	10/13/2000	132500	14.880	77.610	10.936
10	10/13/2000	132600	14.850	77.400	10.958
11	10/13/2000	132700	14.840	77.650	10.937
12	10/13/2000	132800	14.890	77.450	10.977
13	10/13/2000	132900	14.860	77.460	10.939
14	10/13/2000	133000	14.820	77.390	10.981
15	10/13/2000	133100	14.850	77.510	10.946
16	10/13/2000	133200	14.860	77.150	10.932
17	10/13/2000	133300	14.810	77.440	10.897
18	10/13/2000	133400	14.840	77.580	10.983
19	10/13/2000	133500	14.820	77.550	10.876
20	10/13/2000	133600	14.850	77.580	10.945
21	10/13/2000	133700	14.810	77.670	10.964
22	10/13/2000	133800	14.840	77.720	10.973
23	/ /				
24	/ /	AVE	14.850	77.480	10.950

ecord#	DATE	TIME	NOX11	NOXRT12	NOXHCOR13
1	10/13/2000	134700	6.600	0.024	6.500
2	10/13/2000	134800	6.600	0.024	6.400
3	10/13/2000	134900	6.600	0.024	6.400
4	10/13/2000	135000	6.700	0.024	6.500
5	10/13/2000	135100	6.700	0.024	6.500
6	10/13/2000	135200	6.700	0.024	6.500
7	10/13/2000	135300	6.800	0.024	6.500
8	10/13/2000	135400	6.700	0.024	6.600
9	10/13/2000	135500	6.700	0.024	6.500
10	10/13/2000	135600	6.700	0.024	6.400
11	10/13/2000	135700	6.700	0.024	6.500
12	10/13/2000	135800	6.700	0.024	6.500
13	10/13/2000	135900	6.600	0.024	6.400
14	10/13/2000	140000	6.700	0.024	6.500
15	10/13/2000	140100	6.700	0.024	6.400
16	10/13/2000	140200	6.600	0.024	6.400
17	10/13/2000	140300	6.600	0.023	6.400
18	10/13/2000	140400	6.600	0.024	6.400
19	10/13/2000	140500	6.600	0.024	6.400
20	10/13/2000	140600	6.600	0.024	6.300
21	10/13/2000	140700	6.600	0.024	6.300
22	10/13/2000	140800	6.500	0.023	6.300
23	/ /				
24	/ /	AVE	6.650	0.024	6.436

Run 5

ecord#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	134700	14.890	77.600	10.963
2	10/13/2000	134800	14.840	77.830	11.009
3	10/13/2000	134900	14.830	77.660	10.991
4	10/13/2000	135000	14.810	77.800	10.920
5	10/13/2000	135100	14.840	77.740	11.005
6	10/13/2000	135200	14.850	77.770	11.030
7	10/13/2000	135300	14.820	77.810	10.992
8	10/13/2000	135400	14.850	77.740	10.938
9	10/13/2000	135500	14.860	77.860	11.003
10	10/13/2000	135600	14.830	77.910	11.030
11	10/13/2000	135700	14.890	78.080	11.038
12	10/13/2000	135800	14.830	77.780	10.979
13	10/13/2000	135900	14.850	77.980	10.998
14	10/13/2000	140000	14.850	77.930	10.997
15	10/13/2000	140100	14.790	77.660	10.982
16	10/13/2000	140200	14.810	77.900	10.999
17	10/13/2000	140300	14.820	77.400	11.024
18	10/13/2000	140400	14.900	77.350	10.993
19	10/13/2000	140500	14.830	77.600	10.949
20	10/13/2000	140600	14.820	77.400	11.007
21	10/13/2000	140700	14.870	77.830	11.006
22	10/13/2000	140800	14.830	77.730	11.023
23	/	/			
24	/	/	AVE	14.841	77.744	10.994

Record#	DATE	TIME	NOX11	NOXHCOR12	NOXHRT13
1	10/13/2000	141800	6.600	6.400	0.024
2	10/13/2000	141900	6.600	6.500	0.024
3	10/13/2000	142000	6.600	6.500	0.024
4	10/13/2000	142100	6.600	6.300	0.024
5	10/13/2000	142200	6.600	6.400	0.023
6	10/13/2000	142300	6.700	6.500	0.024
7	10/13/2000	142400	6.700	6.500	0.024
8	10/13/2000	142500	6.700	6.500	0.024
9	10/13/2000	142600	6.700	6.500	0.024
10	10/13/2000	142700	6.700	6.500	0.024
11	10/13/2000	142800	6.800	6.500	0.024
12	10/13/2000	142900	6.700	6.500	0.024
13	10/13/2000	143000	6.700	6.600	0.024
14	10/13/2000	143100	6.700	6.400	0.024
15	10/13/2000	143200	6.700	6.500	0.024
16	10/13/2000	143300	6.700	6.500	0.024
17	10/13/2000	143400	6.700	6.500	0.024
18	10/13/2000	143500	6.700	6.500	0.024
19	10/13/2000	143600	6.700	6.400	0.024
20	10/13/2000	143700	6.700	6.400	0.024
21	10/13/2000	143800	6.700	6.500	0.024
22	10/13/2000	143900	6.700	6.400	0.024
23	/ /				
24	/ /	AVE	6.682	6.468	0.024

Record#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	141800	14.840	77.630	10.923
2	10/13/2000	141900	14.860	77.460	10.965
3	10/13/2000	142000	14.890	77.400	10.929
4	10/13/2000	142100	14.820	77.600	10.995
5	10/13/2000	142200	14.830	77.530	10.969
6	10/13/2000	142300	14.850	77.490	10.987
7	10/13/2000	142400	14.830	77.510	10.942
8	10/13/2000	142500	14.800	77.510	10.972
9	10/13/2000	142600	14.830	77.910	10.989
10	10/13/2000	142700	14.830	77.690	10.995
11	10/13/2000	142800	14.840	77.490	10.970
12	10/13/2000	142900	14.830	77.060	10.893
13	10/13/2000	143000	14.840	77.480	10.962
14	10/13/2000	143100	14.830	77.850	10.998
15	10/13/2000	143200	14.850	77.940	10.956
16	10/13/2000	143300	14.840	78.200	10.968
17	10/13/2000	143400	14.810	77.630	10.996
18	10/13/2000	143500	14.820	77.630	10.972
19	10/13/2000	143600	14.810	77.430	10.993
20	10/13/2000	143700	14.840	77.480	10.955
21	10/13/2000	143800	14.880	77.450	10.965
22	10/13/2000	143900	14.790	77.420	10.870
23	/ /				
24	/ /	AVE	14.835	77.581	10.962

Record#	DATE	TIME	NOX11	NOXHCOR12	NOXHRT13
1	10/13/2000	145100	6.700	6.400	0.024
2	10/13/2000	145200	6.700	6.500	0.024
3	10/13/2000	145300	6.800	6.600	0.024
4	10/13/2000	145400	6.800	6.600	0.024
5	10/13/2000	145500	6.800	6.500	0.024
6	10/13/2000	145600	6.800	6.500	0.024
7	10/13/2000	145700	6.800	6.600	0.024
8	10/13/2000	145800	6.800	6.600	0.024
9	10/13/2000	145900	6.800	6.500	0.024
10	10/13/2000	150000	6.800	6.600	0.024
11	10/13/2000	150100	6.800	6.600	0.025
12	10/13/2000	150200	6.800	6.600	0.024
13	10/13/2000	150300	6.800	6.600	0.024
14	10/13/2000	150400	6.800	6.600	0.024
15	10/13/2000	150500	6.800	6.600	0.025
16	10/13/2000	150600	6.700	6.600	0.024
17	10/13/2000	150700	6.800	6.600	0.024
18	10/13/2000	150800	6.800	6.600	0.025
19	10/13/2000	150900	6.800	6.600	0.024
20	10/13/2000	151000	6.800	6.600	0.024
21	10/13/2000	151100	6.800	6.500	0.024
22	10/13/2000	151200	6.700	6.400	0.024
23	/ /				
24	/ /	AVE	6.782	6.559	0.024

Run 7

Record#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	145100	14.850	78.000	11.012
2	10/13/2000	145200	14.850	77.880	10.924
3	10/13/2000	145300	14.850	77.850	10.923
4	10/13/2000	145400	14.830	77.730	10.974
5	10/13/2000	145500	14.790	77.840	11.026
6	10/13/2000	145600	14.800	77.760	10.981
7	10/13/2000	145700	14.830	77.620	10.989
8	10/13/2000	145800	14.860	77.640	10.938
9	10/13/2000	145900	14.830	77.450	10.950
10	10/13/2000	150000	14.800	77.310	10.978
11	10/13/2000	150100	14.830	77.590	10.955
12	10/13/2000	150200	14.800	77.650	10.984
13	10/13/2000	150300	14.840	77.700	10.947
14	10/13/2000	150400	14.870	77.690	10.960
15	10/13/2000	150500	14.900	77.660	11.017
16	10/13/2000	150600	14.860	77.640	10.943
17	10/13/2000	150700	14.840	77.690	10.961
18	10/13/2000	150800	14.880	77.830	11.013
19	10/13/2000	150900	14.840	77.550	10.959
20	10/13/2000	151000	14.870	77.310	10.947
21	10/13/2000	151100	14.820	77.290	10.982
22	10/13/2000	151200	14.840	77.480	10.968
23	/ /				
24	/ /	AVE	14.840	77.644	10.970

Record#	DATE	TIME	NOX11	NOXHCOR12	NOXHRT13
1	10/13/2000	152300	6.700	6.400	0.024
2	10/13/2000	152400	6.600	6.500	0.024
3	10/13/2000	152500	6.600	6.400	0.024
4	10/13/2000	152600	6.700	6.400	0.024
5	10/13/2000	152700	6.700	6.500	0.024
6	10/13/2000	152800	6.700	6.400	0.024
7	10/13/2000	152900	6.700	6.400	0.024
8	10/13/2000	153000	6.700	6.500	0.024
9	10/13/2000	153100	6.700	6.500	0.024
10	10/13/2000	153200	6.700	6.500	0.024
11	10/13/2000	153300	6.700	6.500	0.024
12	10/13/2000	153400	6.700	6.600	0.024
13	10/13/2000	153500	6.800	6.600	0.024
14	10/13/2000	153600	6.800	6.500	0.024
15	10/13/2000	153700	6.800	6.600	0.024
16	10/13/2000	153800	6.800	6.600	0.024
17	10/13/2000	153900	6.800	6.500	0.024
18	10/13/2000	154000	6.700	6.600	0.024
19	10/13/2000	154100	6.700	6.400	0.024
20	10/13/2000	154200	6.700	6.400	0.024
21	10/13/2000	154300	6.800	6.600	0.024
22	10/13/2000	154400	6.800	6.600	0.025
23	/ /				
24	/ /	AVE	6.723	6.500	0.024

Run 8

Record#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	152300	14.800	77.770	10.944
2	10/13/2000	152400	14.800	77.420	10.981
3	10/13/2000	152500	14.800	77.280	10.946
4	10/13/2000	152600	14.830	77.570	10.932
5	10/13/2000	152700	14.830	77.550	10.951
6	10/13/2000	152800	14.780	77.340	10.917
7	10/13/2000	152900	14.810	77.580	10.964
8	10/13/2000	153000	14.880	77.590	10.920
9	10/13/2000	153100	14.840	77.500	10.931
10	10/13/2000	153200	14.810	77.860	10.934
11	10/13/2000	153300	14.810	77.670	10.969
12	10/13/2000	153400	14.820	77.710	10.900
13	10/13/2000	153500	14.810	77.970	11.005
14	10/13/2000	153600	14.800	77.900	10.998
15	10/13/2000	153700	14.810	77.570	10.961
16	10/13/2000	153800	14.800	77.650	10.937
17	10/13/2000	153900	14.820	77.400	10.924
18	10/13/2000	154000	14.850	77.600	10.953
19	10/13/2000	154100	14.810	77.830	10.987
20	10/13/2000	154200	14.770	78.140	11.027
21	10/13/2000	154300	14.860	77.840	10.942
22	10/13/2000	154400	14.870	78.020	10.981
23	/ /				
24	/ /	AVE	14.819	77.671	10.955

Record#	DATE	TIME	NOX11	NOXHCOR12	NOXHRT13
1	10/13/2000	155200	6.700	6.400	0.024
2	10/13/2000	155300	6.600	6.400	0.023
3	10/13/2000	155400	6.600	6.400	0.024
4	10/13/2000	155500	6.600	6.300	0.023
5	10/13/2000	155600	6.600	6.400	0.023
6	10/13/2000	155700	6.600	6.300	0.023
7	10/13/2000	155800	6.600	6.200	0.023
8	10/13/2000	155900	6.600	6.300	0.023
9	10/13/2000	160000	6.600	6.300	0.023
10	10/13/2000	160100	6.600	6.200	0.023
11	10/13/2000	160200	6.600	6.300	0.023
12	10/13/2000	160300	6.600	6.300	0.023
13	10/13/2000	160400	6.600	6.400	0.023
14	10/13/2000	160500	6.600	6.400	0.023
15	10/13/2000	160600	6.700	6.400	0.024
16	10/13/2000	160700	6.700	6.500	0.024
17	10/13/2000	160800	6.700	6.500	0.024
18	10/13/2000	160900	6.800	6.500	0.024
19	10/13/2000	161000	6.800	6.500	0.024
20	10/13/2000	161100	6.800	6.600	0.024
21	10/13/2000	161200	6.800	6.600	0.024
22	10/13/2000	161300	6.800	6.600	0.025
23	/ /				
24	/ /	AVE	6.664	6.400	0.024

RUN 9

ecord#	DATE	TIME	O211	GEN12	GAS13
1	10/13/2000	155200	14.860	77.790	11.034
2	10/13/2000	155300	14.780	78.150	10.993
3	10/13/2000	155400	14.770	77.810	10.930
4	10/13/2000	155500	14.820	77.760	10.976
5	10/13/2000	155600	14.800	77.640	10.969
6	10/13/2000	155700	14.800	77.690	11.044
7	10/13/2000	155800	14.790	77.700	10.947
8	10/13/2000	155900	14.780	77.850	10.948
9	10/13/2000	160000	14.790	77.590	10.965
10	10/13/2000	160100	14.790	77.910	10.990
11	10/13/2000	160200	14.800	77.720	10.952
12	10/13/2000	160300	14.770	77.740	10.960
13	10/13/2000	160400	14.860	77.500	10.899
14	10/13/2000	160500	14.790	77.530	10.963
15	10/13/2000	160600	14.810	77.630	10.958
16	10/13/2000	160700	14.820	77.490	10.955
17	10/13/2000	160800	14.810	77.200	10.919
18	10/13/2000	160900	14.810	77.400	10.969
19	10/13/2000	161000	14.800	77.640	10.950
20	10/13/2000	161100	14.840	77.800	10.946
21	10/13/2000	161200	14.850	77.780	10.956
22	10/13/2000	161300	14.860	77.550	10.959
23	/	/			
24	/	/	AVE	14.809	77.676	10.963

D. FUEL ANALYSIS

8210 Mosley Rd.
Houston, TX 77075
713 943-9776 Telephone
713 943-3846 Facsimile

CORE LABORATORIES

DAVID SMITH
TAMPA ELECTRIC CO.

P.O. BOX 111
TAMPA, FL 33601

Sample Number: 105001-04
Sample Date: 10/13/00
Date Reported: 11/1/00
Date Received: 10/24/00
Sample ID: NATURAL GAS SAMPLE
Description: HARDEE POWER UNIT# **2B**

Analytical Report

Test	Result	Units	Method	Date	Analyst
Ultimate Analysis					
Oxygen	0.80	Mol %	GPA 2261-95	11/1/00	TH
Nitrogen	2.98	Mol %	GPA 2261-95		
Carbon Dioxide	0.78	Mol %	GPA 2261-95		
Methane	92.20	Mol %	GPA 2261-95		
Ethane	2.48	Mol %	GPA 2261-95		
Propane	0.45	Mol %	GPA 2261-95		
Isobutane	0.10	Mol %	GPA 2261-95		
n-Butane	0.10	Mol %	GPA 2261-95		
Isopentane	0.03	Mol %	GPA 2261-95		
n-Pentane	0.02	Mol %	GPA 2261-95		
Hexanes Plus	0.06	Mol %	GPA 2261-95		
Total	100.00	Mol %	GPA 2261-95		
Molar Mass Ratio	0.59999		GPA 2172-96		
Relative Density	0.60102		GPA 2172-96		
Compressibility Factor	0.99788		GPA 2172-96		
Gross Heating Value (Dry)	988.0	BTU/CF (Ideal	GPA 2172-96		
Gross Heating Value (Dry)	1000.1	BTU/CF (Real	GPA 2172-96		
Net Heating Value	899.3	BTU/CF (Ideal	GPA 2172-96		
Net Heating Value	901.3	BTU/CF (Real	GPA 2172-96		
Pressure Base	14.696	psia			
Carbon	69.62	Wt %			
Hydrogen	22.67	Wt %			
Oxygen	2.91	Wt %			
Nitrogen	4.80	Wt %			
Sulfur	0.00	Wt %			

Approved By:

Jean Waits
Supervising Chemist

E. V.E. DATA SHEETS

TAMPA ELECTRIC
A TECO ENERGY COMPANY

VISIBLE EMISSION OBSERVATION

E-496 R 10/85

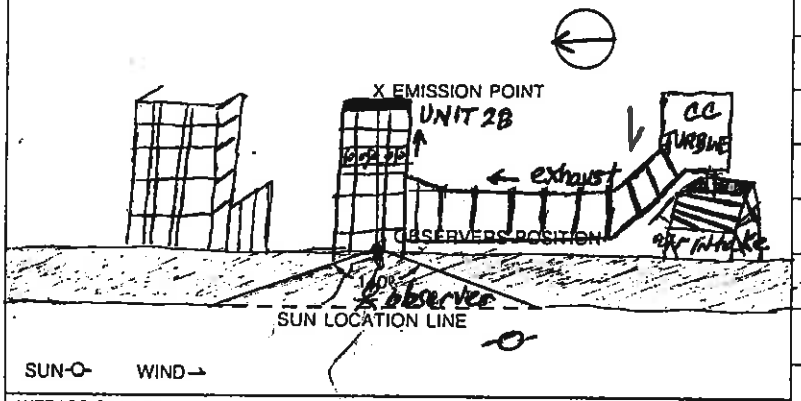
SOURCE NAME	SOURCE LOCATION	OBSERVATION DATE	START TIME	STOP TIME
HARDEE POWER STATION	UNIT 2B TURBINE CC	10/13/00	12:30	13:30

TYPE OF FACILITY: NATURAL GAS/OIL-FIRED TURBINE COGENERATOR

DISTANCE FROM OBSERVER: 75'

SKY CONDITIONS/PLUME BACKGROUND: BROKEN SKIES / BLUE BACKGROUND

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



AVERAGE OPACITY: 0.0%

WIND SPEED (EST.)	WIND DIRECTION (EST.)
~ 10-15 MPH	EASTERLY

OBSERVER'S NAME (PRINT): JAMES A. WERNER

OBSERVER'S SIGNATURE: James Werner

DATE: 10/13/00

COMMENTS:

∠ of inclination : 18°

ambient temperature : 88°F

Unit fired on natural gas

COPY OF VISIBLE EMISSIONS CERTIFICATION CARD

State of Florida
Department of Environmental Protection

This is to Certify That

JAMES WERNER

has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.

This Certificate Expires: Feb 23, 2001

Certificate Officer

Bearer's Signature

SEC. MIN	0	15	30	45	SEC MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

F. TCEMS CALIBRATION DATA

F-1 TCEM SETUP

F-2 INITIAL/FINAL TCEMS CALIBRATIONS

F-3 SYSTEM BIAS TESTS

F-4 SYSTEM BIAS AND DRIFT CALCULATIONS

F-2 INITIAL/FINAL TCEMS CALIBRATIONS

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: INITIAL BIAS CALIBRATION

DATE : 10-13-2000 TIME: 11:51 - 12:00

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%02	0.00	0.03
3	STACK	%02	12.00	12.00
4	STACK	ppmCO	0.0	0.0
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.3
6	STACK	ppmNOX	25.5	25.6

F-3 SYSTEM BIAS TESTS

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN ONE BIAS CALIBRATION

DATE : 10-~~14~~ 13 MP -2000 TIME: ~~00:02~~ 12:02 - ~~00:09~~ 12:09 MP

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%02	0.00	0.05
3	STACK	%02	12.00	12.00
4	STACK	ppmCO	0.0	0.1
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.2
6	STACK	ppmNOX	25.5	25.5

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN TWO BIAS CALIBRATION

DATE : 10-~~14~~ 13 -2000 TIME: 12:33 - 12:42

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%02	0.00	0.02
3	STACK	%02	12.00	11.97
4	STACK	ppmCO	0.0	0.0
4	STACK	ppmCO	3.0	3.1
6	STACK	ppmNOX	0.0	0.2
6	STACK	ppmNOX	25.5	25.7

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN TWO BIAS CALIBRATION

DATE : 10-~~14~~ 13-2000 TIME: 12:33 - 12:42

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%O2	0.00	0.02
3	STACK	%O2	12.00	11.97
4	STACK	ppmCO	0.0	0.0
4	STACK	ppmCO	3.0	3.1
6	STACK	ppmNOX	0.0	0.2
6	STACK	ppmNOX	25.5	25.7

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN THREE BIAS CALIBRATION

DATE : 10-~~14~~ 13-2000 TIME: 13:06 - 13:13

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%O2	0.00	0.03
3	STACK	%O2	12.00	12.01
4	STACK	ppmCO	0.0	0.2
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.3
6	STACK	ppmNOX	25.5	25.6

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN FOUR BIAS CALIBRATION

DATE : 10-14-2000 (13-NP) TIME: 13:38 - 13:44

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%O2	0.00	0.03
3	STACK	%O2	12.00	11.97
4	STACK	ppmCO	0.0	0.1
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.4
6	STACK	ppmNOX	25.5	25.7

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN FIVE DRIFT CALIBRATION

DATE : 10-~~14~~ 13-2000 TIME: 14:08 -- 14:15

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%O2	0.00	0.03
3	STACK	%O2	12.00	12.00
4	STACK	ppmCO	0.0	0.0
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.6
6	STACK	ppmNOX	25.5	25.7

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN SIX BIAS CALIBRATION

DATE : 10-13-2000 TIME: 14:39 - 14:47

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%02	0.00	0.04
3	STACK	%02	12.00	11.98
4	STACK	ppmCO	0.0	0.1
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.3
6	STACK	ppmNOX	25.5	25.4

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN SEVEN BIAS CALIBRATION

DATE : 10-~~14~~ 13 NP -2000 TIME: 15:12 - 15:18

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%O2	0.00	0.04
3	STACK	%O2	12.00	11.99
4	STACK	ppmCO	0.0	0.2
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.5
6	STACK	ppmNOX	25.5	25.7

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN EIGHT BIAS CALIBRATION

DATE : 10-~~14~~13-2000 TIME: 15:44 - 15:49

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	STACK	%02	0.00	0.04
3	STACK	%02	12.00	12.00
4	STACK	ppmCO	0.0	0.0
4	STACK	ppmCO	3.0	3.0
6	STACK	ppmNOX	0.0	0.6
6	STACK	ppmNOX	25.5	25.6

CALIBRATION SUMMARY

SOURCE: HARDEE POWER STATION UNIT 2B RATA

REASON: RUN NINE BIAS CALIBRATION

DATE : 10-13-2000 TIME: 16:13 - 16:18

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	0.05
5	STACK	%02	12.00	11.99
4	STACK	ppmCO	0.0	-0.0
4	STACK	ppmCO	3.0	3.1
6	STACK	ppmNOX	0.0	0.5
6	STACK	ppmNOX	25.5	25.5

F-4 SYSTEM BIAS AND DRIFT CALCULATIONS

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 1

SPAN VALUE: 10 ppm CO

		------INITIAL VALUES------		------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.00	0.00	0.10	1.00	1.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 2

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.10	1.00	0.00	0.00	-1.00
CO UP-SCALE	3.00	3.00	0.00	3.10	1.00	1.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 3

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.00	0.00	0.10	1.00	1.00
CO UP-SCALE	3.00	3.10	1.00	3.00	0.00	-1.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 4

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.20	2.00	0.10	1.00	-1.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 5

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.10	1.00	0.00	0.00	-1.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 6

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.00	0.00	0.10	1.00	1.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 7

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.10	1.00	0.20	2.00	1.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 8

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.20	2.00	0.00	0.00	-2.00
CO UP-SCALE	3.00	3.00	0.00	3.00	0.00	0.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: HARDEE POWER STATION UNIT 2B

TEST DATE: 10/13/2000

RUN NUMBER: 9

SPAN VALUE: 10 ppm CO

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
CO ZERO GAS	0.00	0.00	0.00	0.00	0.00	0.00
CO UP-SCALE	3.00	3.00	0.00	3.10	1.00	1.00

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

G. CALIBRATION GAS CERTIFICATES OF ANALYSIS

FAHARD 7

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: EN75516
Project No.: 01-43154-002

Customer

TAMPA ELECTRIC
CRAIG CORONADO
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: ALM042722 **Certification Date:** 10/09/00 **Exp. Date:** 10/09/2002
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	25.32	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	25.46	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.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1683	4/03/03	ALM017214	48.90 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA220/5708850810	09/22/00	CHEMILUMINESCENCE

ANALYZER READINGS

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

First Triad Analysis

NITRIC OXIDE

Date:10/02/00	Response Unit:VOLTS	
Z1=0.00370	R1=3.16600	T1=1.64250
R2=3.16650	Z2=0.00600	T2=1.64290
Z3=0.00540	T3=1.63900	R3=3.17540
Avg. Concentration:	25.36	PPM

Second Triad Analysis

Date: 10/09/00	Response Unit: VOLTS	
Z1=0.00520	R1=3.17810	T1=1.64090
R2=3.18080	Z2=0.00540	T2=1.64220
Z3=0.00650	T3=1.64010	R3=3.18910
Avg. Concentration:	25.28	PPM

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=0.99999	1683
Constants:	A=0.058937
B=15.458178	C=
D=	E=

APPROVED BY: _____
COLIN MCCARTY

CEM #490 E4

Scott Specialty Gases

Shipped From: 1750 EAST CLUB BLVD
DURHAM NC 27704
Phone: 919-220-0803 Fax: 919-220-0808

CERTIFICATE OF ANALYSIS

TAMPA ELECTRIC CO

5010 CAUSEWAY BLVD

TAMPA FL 33619

PROJECT #: 12-31219-002
PO#: N31923
ITEM #: 12021451 4AL
DATE: 11/13/98

CYLINDER #: ALM017012
FILL PRESSURE: 2015 PSIG

ANALYTICAL ACCURACY: +-2%

BLEND TYPE : CERTIFIED MASTER GAS

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
CARBON MONOXIDE	3.	PPM	3.00	PPM
NITROGEN		BALANCE		BALANCE

ANALYST: G. BARTNETT

LES HARDS

Scott Specialty Gases

Shipped From: 1750 EAST CLUB BLVD
DURHAM NC 27704
Phone: 919-220-0803 Fax: 919-220-0808

C E R T I F I C A T E O F A N A L Y S I S

TAMPA ELECTRIC CO

5010 CAUSEWAY BLVD

TAMPA FL 33619

PROJECT #: 12-31219-003
PO#: N31923
ITEM #: 12021451 4AL
DATE: 11/13/98

CYLINDER #: ALM045053
FILL PRESSURE: 2015 PSIG

ANALYTICAL ACCURACY: +-2%
Exp. None

BLEND TYPE : CERTIFIED MASTER GAS

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
CARBON MONOXIDE	6.	PPM	6.09	PPM
NITROGEN		BALANCE		BALANCE

ANALYST: G. BARTNETT

H. TEST PARTICIPANTS

HARDEE POWER PARTNERS
HARDEE POWER STATION
TEST PARTICIPANTS

Environmental Affairs

Robert Barthelette	Environmental Technician
Craig Coronado	Technician
Mike Skirvin	Environmental Technician
David Smith	Coordinator-Air Services
James Werner	Technician

TECO Power Services

Carl Tucker	Maintenance Specialist
Mike McMullen	Sr. Consulting Engineer
Frank Sarduy	Coordinator - Environmental