Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

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Fayetteville Regional Office

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William W. Cobey, Jr., Secretary

DIVISION OF ENVIRONMENTAL MANAGEMENT

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March 9, 1990

Mr. Steven K. Blanchard, Chief
Electrical Engineer
Public Works Commission
P.O. Box 1089
Fayetteville, NC 28301

SUBJECT: Review of Source Test Report
Stationary Gas Turbine Electric Generating Units
Public Works Commission, City of Fayetteville
Cumberland County

Dear Mr. Blanchard:

A review of the submitted source test report as conducted by Interpoll Laboratories, Inc., January 18-25, 1989, on the Turbine Generating Units has been completed and found to be acceptable. The results appear to be reliable and indicate that compliance with the applicable emission limits and testing requirements was being achieved during the test.

The following operating parameters and appropriate test results apply:

a. Turbines 1 through 6 were each tested firing oil at full load. Compliance with the NO_x emission limits of Subpart GG was demonstrated.

Unit	Measured NO_x, PPM	GG Std, PPM
1	65.93	109.48
2	67.74	130.15
3	69.10	121.48
4	69.77	121.48
5	64.40	121.48
6	61.56	121.48

b. Turbine 7 was tested firing distillate oil and natural gas at the Subpart GG loads. Compliance with the NO_x emission limits and all testing requirements of GG were demonstrated.

Fuel	Load, MW	Measured NO_x, PPM	GG Std, PPM
Oil	3	34.73	109.48
Oil	11	55.52	109.48
Oil	20	60.08	109.48
Oil	29	78.83	109.48
N.G.	3	44.85	88.67
N.G.	11	65.78	88.67
N.G.	20	45.09	88.67
N.G.	29	68.25	88.67

c. Turbine 8, an NSPS Source, was tested firing distillate oil and natural gas at the Subpart GG required loads. Compliance with the NO_x emission limits and all testing requirements of GG were demonstrated.

Fuel	Load, MW	Measured NO_x, PPM	GG Std, PPM
Oil	3	40.92	111.61
Oil	11	47.11	101.48
Oil	20	57.75	101.48
Oil	27	72.15	101.48
N.G.	3	31.61	88.67
N.G.	11	54.81	88.67
N.G.	20	42.67	88.67
N.G.	27	67.16	88.67

d. All eight Turbines demonstrated compliance with the sulfur in fuel limit set forth in Subpart GG. Calculations based on sulfur analysis and heating value of the fuel indicate that the SO_2 emissions ranged from 0.20 to 0.24 pound SO_2 per million BTU and, therefore, also demonstrated compliance with the SO_2 limits of 2.3 pounds per million BTU of 15A NCAC 2D .0516.

If you have any questions, please do not hesitate to contact me at this office at (919) 486-1541. Your cooperation in preserving the environment of North Carolina is appreciated.

Sincerely,

Kenneth G. Smack
Environmental Regional Supervisor I

KGS/tf
cc: John Hunter
Mike Aldridge

Interpoll Laboratories, Inc.
4500 Ball Road N.E.
Circle Pines, Minnesota 55014-1819

TEL: (612) 786-6020
FAX: (612) 786-7854

RESULTS OF THE JANUARY 1989 NO_x EMISSION TESTS ON THE UNITS 1 - 6, 7 AND 8 GAS TURBINES IN FAYETTEVILLE, NORTH CAROLINA

VOLUME I

BUTLER WARNER
JUN 23 1989
GENERATION PLANT

Submitted to:

CITY OF FAYETTEVILLE
Public Works Commission
c/o Black and Veatch
P.O. Box 8405
Kansas City, Missouri 64114

Attention: John Cochran

Approved by:

Perry Lonnes

Perry Lonnes, Ph.D.
Director
Field Testing Division

Report Number 9-2713
June 21, 1989
PL/klq

TABLE OF CONTENTS

	ABBREVIATIONS	iii
1	INTRODUCTION	1
2	SUMMARY AND DISCUSSION	3
3	RESULTS	7

Appendices:

A - Turbine 1 Field Data Sheets
B - Turbine 2 Field Data Sheets
C - Turbine 3 Field Data Sheets
D - Turbine 4 Field Data Sheets
E - Turbine 6 Field Data Sheets
F - Turbine 5 Field Data Sheets
G - Turbine 7 Field Data Sheets
H - Turbine 8 Field Data Sheets
I - Gas Analyzers Specifications
J - Measurement System Performance Specifications
K - Calibration Gas Certification Data
L - Fuel Analyses
M - Calculation Equations
N - Procedures

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (^{0}F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^6BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/DSCM	milligrams per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	$\leq$ (when following a number)

Standard conditions are defined as 68 ^{0}F (20 ^{0}C) and 29.92 IN. of mercury pressure.

1 INTRODUCTION

During the Period January 18 - 25, 1989, Interpoll Laboratories personnel conducted oxides of nitrogen (NO_x) emission determinations on eight gas turbines at the City of Fayetteville Generation Plant located in Fayetteville, North Carolina. Turbine Nos. 1 - 6 were tested burning distillate fuel at base load only. Turbines 7 and 8 were tested burning both natural gas and distillate at four different loads. On-site testing was performed by E. Trowbridge and M. Kaehler. Coordination between testing activities and plant operation was provided by Steve Clark of Black and Veatch. Portions of the testing were witnessed by Kenneth Smack of the North Carolina Department of Natural Resources and Community Development.

NO_x emission rate determinations were conducted at each test condition according to the provisions of EPA Methods 3A and 20, CFR Title 40 Part 60, Appendix A (revised July 1, 1987) using equipment meeting the specifications therein. A visible emission determination was conducted for each fuel and load as per EPA Method 9 (Ibid) by E. Trowbridge, an EPA-trained observer.

Prior to the NO_x test on each of the eight units, a 48-point preliminary traverse for oxygen was conducted in accordance with EPA Method 20 at the low load condition when distillate was fired. The eight points with the lowest oxygen levels were selected from these measurements and these points were used for all subsequent sets of measurements on that gas turbine.

The gas concentrations were all measured instrumentally. A slip stream of exhaust gas was drawn from the duct using a stainless steel probe with a heated out-stack filter to remove interfering particulate matter. Moisture was removed by an in-line VIA Model MAK 2-1 Condenser. The dry particulate free gas stream was then split and introduced to the

NO_x, CO_2 and O_2 analyzers. A Thermo Environmental Instruments Model 10A chemiluminescent analyzer was used to measure NO_x concentrations in the gas stream. Carbon dioxide concentrations were measured using a short path Fugi Model 3300 NDIR analyzer and the oxygen content measured with a Teledyne Model 320P electrochemical analyzer. A multipoint calibration (calibration error check) was performed on each analyzer prior to each test. A zero and midlevel calibration check (system bias) was performed between each run. These results were recorded by the operator and are documented with the field data for each turbine. The analyzer system response time check and the NO_x analyzer interference check is presented in Appendix J. Strip chart recorders were used to record each analyzer's response.

The results of the gas turbine NO_x emissions testing are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the Appendices.

2 SUMMARY AND DISCUSSION

The important results of the NO_x emission rate tests on the eight gas turbines are summarized in Tables 1 - 3. This order does not lend itself to data interpretational needs and thus the data is presented in order of turbine number. The chronological order in which the tests were performed was based on plant operating considerations.

As will be noted, all of the eight turbines comply with the federal maximum allowed standard.

Table 1. Summary of the Results of the January 1989 Oxides of Nitrogen Determinations on the Gas Turbines at the City of Fayetteville Generation Plant in Fayetteville, North Carolina.

Test /Run	Source /Fuel	Load (MW)	NOx Concentration (measured)	(@15% O2)	(@15% O2-ISO)	(max allowed-STD)	Opacity (%)
9/1	Unit 1/Oil	24	60	61	62	117	
9/2	Unit 1/Oil	24	61	60	61	117	
9/3	Unit 1/Oil	24	61	64	66	117	
Avg		24	61	62	63	117	
20/1	Unit 2/Oil	26	66	71	66	117	
20/2	Unit 2/Oil	25	66	64	60	117	
20/3	Unit 2/Oil	25	66	62	61	117	
Avg		25	66	66	61	117	0
21/1	Unit 3/Oil	24	70	67	69	117	
21/2	Unit 3/Oil	24	67	68	70	117	
21/3	Unit 3/Oil	24	68	67	69	117	
Avg		24	68	67	69	117	0
22/1	Unit 4/Oil	26	70	70	64	117	
22/2	Unit 4/Oil	25	66	64	61	117	
22/3	Unit 4/Oil	25	66	68	67	117	
Avg		25	67	67	64	117	0
19/1	Unit 5/Oil	25	63	58	58	117	
19/2	Unit 5/Oil	25	66	63	63	117	
19/3	Unit 5/Oil	25	67	70	70	117	
Avg		25	65	64	64	117	0
18/1	Unit 6/Oil	25	63	58	55	117	
18/2	Unit 6/Oil	25	64	64	61	117	
18/3	Unit 6/Oil	25	63	62	60	117	
Avg		25	63	61	59	117	0

Table 2. Summary of the Results of the January 1989 Oxides of Nitrogen Determinations on the Gas Turbines at the City of Fayetteville Generation Plant in Fayetteville, North Carolina.

Test /Run	Source /Fuel	Load (MW)	NOx Concentration (measured)	(@15% O2)	(@15% O2-ISO)	(max allowed-STD)	Opacity (%)
10/1	Unit 7/Oil	3	14	33	29	117	
10/2	Unit 7/Oil	3	13	36	32	117	
10/3	Unit 7/Oil	3	13	32	28	117	
Avg		3	13	34	30	117	0
11/1	Unit 7/Oil	11	28	49	45	117	
11/2	Unit 7/Oil	11	28	45	41	117	
11/3	Unit 7/Oil	11	27	66	60	117	
Avg		11	28	53	49	117	
12/1	Unit 7/Oil	20	44	61	55	117	
12/2	Unit 7/Oil	20	45	56	51	117	
12/3	Unit 7/Oil	20	45	54	49	117	
Avg		20	45	57	52	117	0
13/1	Unit 7/Oil	29	76	75	66	117	
13/2	Unit 7/Oil	29	75	73	64	117	
13/3	Unit 7/Oil	29	77	75	66	117	
Avg		29	76	74	65	117	0
17/1	Unit 7/NG	3	15	34	31	89	
17/2	Unit 7/NG	3	16	48	45	89	
17/3	Unit 7/NG	3	16	48	44	89	
Avg		3	16	43	40	89	*
16/1	Unit 7/NG	11	36	68	61	89	
16/2	Unit 7/NG	11	36	62	55	89	
16/3	Unit 7/NG	11	36	63	57	89	
Avg		11	36	64	58	89	0
15/1	Unit 7/NG	20	33	42	37	89	
15/2	Unit 7/NG	20	33	47	41	89	
15/3	Unit 7/NG	20	34	43	38	89	
Avg		20	33	44	39	89	0
14/1	Unit 7/NG	29	64	64	56	89	
14/2	Unit 7/NG	29	66	62	55	89	
14/3	Unit 7/NG	29	66	71	62	89	
Avg		29	65	66	58	89	0

* Unable to read due to overcast skies

Table 3. Summary of the Results of the January 1989 Oxides of Nitrogen Determinations on the Gas Turbines at the City of Fayetteville Generation Plant in Fayetteville, North Carolina.

Test /Run	Source /Fuel	Load (MW)	NOx Concentration (measured)	(@15% O2)	(@15% O2-ISO)	(max allowed-STD)	Opacity (%)
23/1	Unit 8/Oil+NG	3	15	43	44	-	
23/2	Unit 8/Oil+NG	3	15	33	34	-	
23/3	Unit 8/Oil	3	15	46	47	117	
Avg		3	15	41	42		
4/1	Unit 8/Oil	11	27	46	47	117	
4/2	Unit 8/Oil	11	28	45	46	117	
4/3	Unit 8/Oil	11	27	45	45	117	
Avg		11	27	45	46	117	0
3/1	Unit 8/Oil	20	47	55	56	117	
3/2	Unit 8/Oil	20	46	55	56	117	
3/3	Unit 8/Oil	20	44	54	56	117	
Avg		20	46	55	56	117	0
2/1	Unit 8/Oil	27	72	70	66	117	
2/2	Unit 8/Oil	27	73	69	69	117	
2/3	Unit 8/Oil	26	72	69	70	117	
Avg		27	72	69	68	117	0
8/1	Unit 8/NG	3	13	31	31	89	
8/2	Unit 8/NG	3	12	29	29	89	
8/3	Unit 8/NG	3	12	30	30	89	
Avg		3	12	30	30	89	
7/1	Unit 8/NG	11	30	52	51	89	
7/2	Unit 8/NG	11	31	54	53	89	
7/3	Unit 8/NG	11	30	51	50	89	
Avg		11	30	52	51	89	
6/1	Unit 8/NG	20	30	45	44	89	
6/2	Unit 8/NG	20	30	38	37	89	
6/3	Unit 8/NG	20	29	37	38	89	
Avg		20	30	40	40	89	
1/1	Unit 8/NG	27	61	68	64	89	
1/2	Unit 8/NG	27	65	66	63	89	
1/3	Unit 8/NG	27	65	65	63	89	
Avg		27	64	66	63	89	0

3 RESULTS

The results of the Method 20 instrumental determinations are presented in this section. The strip charts for each analyzer were processed and 21-minute averages extracted for each of the test runs. These averages together with the electrical generation rate, fuel type and run dates and times are presented. In addition, NO_x concentrations adjusted to 15% oxygen and 15% oxygen-ISO have been calculated using the dry Oxygen F-Factor method using the latest EPA-published F-Factors for the stated fuels.

Interpoll Laboratories Report No. 9-2713
City of Fayetteville PWC
Fayetteville, North Carolina

Test No. 9
Unit No. 1

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/20/89	01/20/89	01/20/89
Time of Run (HRS)	1448 - 1503	1516 - 1531	1544 - 1559
Load (MW)	24	24	24
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.10	3.31	3.31
oxygen (% v/v,d)	15.13	14.97	15.28
NO_x (ppm,d)			
measured	60	61	61
@ 15% oxygen	61	60	64
@ 15% oxygen - ISO	62	61	66
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.24	0.24	0.25

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Test No. 20
Unit No. 2

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/24/89	01/24/89	01/24/89
Time of Run (HRS)	1034 - 1049	1105 - 1120	1137 - 1152
Load (MW)	26	25	25
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.38	3.32	3.42
oxygen (% v/v,d)	15.37	14.85	14.65
NO_x (ppm,d)			
measured	66	66	66
@ 15% oxygen	71	64	62
@ 15% oxygen - ISO	66	60	61
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.27	0.25	0.24

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Test No. 21
Unit No. 3

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/24/89	01/24/89	01/24/89
Time of Run (HRS)	1452 - 1507	1525 - 1543	1555 - 1611
Load (MW)	24	24	24
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.20	3.06	3.08
oxygen (% v/v,d)	14.75	15.11	14.95
NO_x (ppm,d)			
measured	70	67	68
@ 15% oxygen	67	68	67
@ 15% oxygen - ISO	69	70	69
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.26	0.26	0.26

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Interpoll Laboratories Report No. 9-2713
City of Fayetteville PWC
Fayetteville, North Carolina

Test No. 22
Unit No. 4

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/25/89	01/25/89	01/25/89
Time of Run (HRS)	0928 - 0942	1006 - 1020	1036 - 1050
Load (MW)	26	25	25
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.50	3.40	3.45
oxygen (% v/v,d)	14.98	14.86	15.17
NO_x (ppm,d)			
measured	70	66	66
@ 15% oxygen	70	64	68
@ 15% oxygen - ISO	64	61	67
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.27	0.25	0.26

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Test No. 19
Unit No. 5

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/23/89	01/23/89	01/23/89
Time of Run (HRS)	1619 - 1638	1656 - 1714	1734 - 1752
Load (MW)	25	25	25
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	2.96	3.03	3.06
oxygen (% v/v,d)	14.54	14.71	15.28
NO_x (ppm,d)			
measured	63	66	67
@ 15% oxygen	58	63	70
@ 15% oxygen - ISO	58	63	70
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.23	0.24	0.27

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Test No. 18
Unit No. 6

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/23/89	01/23/89	01/23/89
Time of Run (HRS)	1017 - 1032	1048 - 1103	1116 - 1131
Load (MW)	25	25	25
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.27	3.25	3.26
oxygen (% v/v,d)	14.51	14.96	14.90
NO_x (ppm,d)			
measured	63	64	63
@ 15% oxygen	58	64	62
@ 15% oxygen - ISO	55	61	60
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.22	0.25	0.24

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Base load

Test No. 10
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/21/89	01/21/89	01/21/89
Time of Run (HRS)	1159 - 1215	1227 - 1243	1253 - 1309
Load (MW)	3.0	3.1	3.1
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	1.20	1.15	1.17
oxygen (% v/v,d)	18.45	18.68	18.42
NO_x (ppm,d)			
measured	14	13	13
@ 15% oxygen	33	36	32
@ 15% oxygen - ISO	29	32	28
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.13	0.13	0.12

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
10% load

Test No. 11
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/21/89	01/21/89	01/21/89
Time of Run (HRS)	1338 - 1354	1409 - 1425	1439 - 1455
Load (MW)	11	11	11
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	1.78	1.90	1.73
oxygen (% v/v,d)	17.48	17.25	18.47
NO_x (ppm,d)			
measured	28	28	27
@ 15% oxygen	49	45	66
@ 15% oxygen - ISO	45	41	60
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.19	0.18	0.25

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
40% load

Test No. 12
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/21/89	01/21/89	01/21/89
Time of Run (HRS)	1516 - 1532	1545 - 1601	1616 - 1632
Load (MW)	20	20	20
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	2.56	2.36	2.58
oxygen (% v/v,d)	16.58	16.23	16.00
NO_x (ppm,d)			
measured	44	45	45
@ 15% oxygen	61	56	54
@ 15% oxygen - ISO	55	51	49
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.23	0.22	0.22

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
70% load

Test No. 13
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/21/89	01/21/89	01/21/89
Time of Run (HRS)	1707 - 1723	1734 - 1750	1806 - 1823
Load (MW)	29	29	29
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.32	3.30	3.43
oxygen (% v/v,d)	14.95	14.88	14.85
NO_x (ppm,d)			
measured	76	75	77
@ 15% oxygen	75	73	75
@ 15% oxygen - ISO	66	64	66
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.29	0.29	0.29

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Peak load

Test No. 17
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/22/89	01/22/89	01/22/89
Time of Run (HRS)	1542 - 1558	1609 - 1628	1637 - 1653
Load (MW)	3	3	3
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	0.80	0.82	0.86
oxygen (% v/v,d)	18.25	18.95	18.93
NO_x (ppm,d)			
measured	15	16	16
@ 15% oxygen	34	48	48
@ 15% oxygen - ISO	31	45	44
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.12	0.18	0.18

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
10% load

Test No. 16
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/22/89	01/22/89	01/22/89
Time of Run (HRS)	1402 - 1418	1429 - 1445	1455 - 1511
Load (MW)	11	11	11
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	1.35	1.36	1.36
oxygen (% v/v,d)	17.80	17.48	17.52
NO_x (ppm,d)			
measured	36	36	36
@ 15% oxygen	68	62	63
@ 15% oxygen - ISO	61	55	57
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.25	0.23	0.23

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
40% load

Interpoll Laboratories Report No. 9-2713
City of Fayetteville PWC
Fayetteville, North Carolina

Test No. 15
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/22/89	01/22/89	01/22/89
Time of Run (HRS)	1142 - 1158	1210 - 1225	1240 - 1256
Load (MW)	20	20	20
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	1.91	1.88	1.87
oxygen (% v/v,d)	16.21	16.67	16.33
NO_x (ppm,d)			
measured	33	33	34
@ 15% oxygen	42	47	43
@ 15% oxygen - ISO	37	41	38
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.15	0.17	0.16

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
70% load

Test No. 14
Unit No. 7

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/22/89	01/22/89	01/22/89
Time of Run (HRS)	0953 - 1009	1022 - 1038	1054 - 1110
Load (MW)	29	29	29
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	2.57	2.56	2.56
oxygen (% v/v,d)	14.97	14.66	15.45
NO_x (ppm,d)			
measured	64	66	66
@ 15% oxygen	64	62	71
@ 15% oxygen - ISO	56	55	62
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.23	0.23	0.26

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
Peak load

Test No. 23
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/25/89	01/25/89	01/25/89
Time of Run (HRS)	1305 - 1320	1334 - 1349	1402 - 1417
Load (MW)	3	3	3
Fuel Type	Oil + NG	Oil + NG	Oil
Gas Composition			
carbon dioxide (% v/v,d)	1.30	3.30	3.30
oxygen (% v/v,d)	18.83	18.20	18.93
NO_x (ppm,d)			
measured	15	15	15
@ 15% oxygen	43	33	46
@ 15% oxygen - ISO	44	34	47
Max. allowed - STD	-	-	117
NO_x Emission Rate (LB/10^6BTU)	0.16	0.12	0.17

Note: F-Factor = 9157 DSCF/10^6BTU - Runs 1 and 2; 9190 - Run 3
(EPA-published values)

10% load

Test No. 4
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/20/89	01/20/89	01/20/89
Time of Run (HRS)	1428 - 1444	1500 - 1515	1530 - 1545
Load (MW)	11	11	11
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	1.75	1.71	1.72
oxygen (% v/v,d)	17.37	17.26	17.33
NO_x (ppm,d)			
measured	27	28	27
@ 15% oxygen	46	45	45
@ 15% oxygen - ISO	47	46	45
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.18	0.18	0.17

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
40% load

Interpoll Laboratories Report No. 9-2713
City of Fayetteville PWC
Fayetteville, North Carolina

Test No. 3
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/19/89	01/19/89	01/19/89
Time of Run (HRS)	1225 - 1240	1302 - 1317	1335 - 1351
Load (MW)	20	20	20
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	2.42	2.38	2.32
oxygen (% v/v,d)	15.90	16.05	16.07
NO_x (ppm,d)			
measured	47	46	44
@ 15% oxygen	55	55	54
@ 15% oxygen - ISO	56	56	56
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.22	0.22	0.21

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
70% load

Interpoll Laboratories Report No. 9-2713
City of Fayetteville PWC
Fayetteville, North Carolina

Test No. 2
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/19/89	01/19/89	01/19/89
Time of Run (HRS)	1022 - 1037	1058 - 1113	1133 - 1148
Load (MW)	27	27	26
Fuel Type	Oil	Oil	Oil
Gas Composition			
carbon dioxide (% v/v,d)	3.46	3.11	3.18
oxygen (% v/v,d)	14.77	14.72	14.71
NO_x (ppm,d)			
measured	72	73	72
@ 15% oxygen	70	69	69
@ 15% oxygen - ISO	66	69	70
Max. allowed - STD	117	117	117
NO_x Emission Rate (LB/10^6BTU)	0.27	0.27	0.27

Note: F-Factor = 9190 DSCF/10^6BTU (EPA-Published value)
Peak load

Test No. 8
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/20/89	01/20/89	01/20/89
Time of Run (HRS)	1129 - 1144	1200 - 1215	1228 - 1243
Load (MW)	2.8	2.9	3.0
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	0.79	0.78	0.77
oxygen (% v/v,d)	18.48	18.36	18.51
NO_x (ppm,d)			
measured	13	12	12
@ 15% oxygen	31	29	30
@ 15% oxygen - ISO	31	29	30
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.12	0.10	0.11

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
10% load

Test No. 7
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/20/89	01/20/89	01/20/89
Time of Run (HRS)	0937 - 0952	1006 - 1021	1037 - 1052
Load (MW)	11	11	11
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	1.33	1.31	1.36
oxygen (% v/v,d)	17.52	17.50	17.36
NO_x (ppm,d)			
measured	30	31	30
@ 15% oxygen	52	54	51
@ 15% oxygen - ISO	51	53	50
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.19	0.20	0.18

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
40% load

Test No. 6
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/20/89	01/20/89	01/20/89
Time of Run (HRS)	0748 - 0803	0824 - 0839	0855 - 0910
Load (MW)	20	20	20
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	1.70	1.75	1.58
oxygen (% v/v,d)	16.98	16.30	16.32
NO_x (ppm,d)			
measured	30	30	29
@ 15% oxygen	45	38	37
@ 15% oxygen - ISO	44	37	38
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.17	0.14	0.14

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
70% load

Test No. 1
Unit No. 8

Results of Oxides of Nitrogen Determinations - EPA Method 20.

	Run 1	Run 2	Run 3
Date	01/18/89	01/18/89	01/18/89
Time of Run (HRS)	1650 - 1710	1740 - 1755	1825 - 1840
Load (MW)	27	27	27
Fuel Type	NG	NG	NG
Gas Composition			
carbon dioxide (% v/v,d)	2.32	2.43	2.56
oxygen (% v/v,d)	15.57	15.13	15.08
NO_x (ppm,d)			
measured	61	65	65
@ 15% oxygen	68	66	65
@ 15% oxygen - ISO	64	63	63
Max. allowed - STD	89	89	89
NO_x Emission Rate (LB/10^6BTU)	0.25	0.24	0.24

Note: F-Factor = 8710 DSCF/10^6BTU (EPA-Published value)
Peak load

APPENDIX A

TURBINE 1 FIELD DATA SHEETS

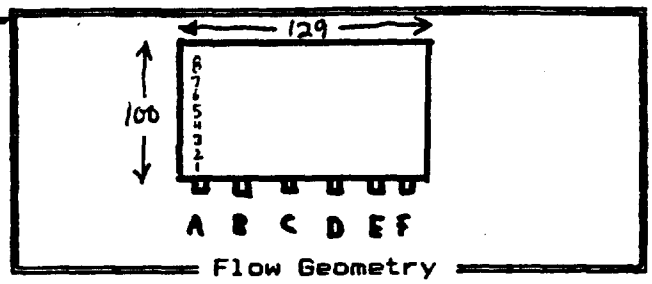
INTERPOLL LABORATORIES

Stationary Gas Turbine NOx Determination

EPA Method 20-Preliminary Diluent Traverse

(Oxygen)

Turbine 1 Manuf. General Electric
Turbine S/N 244261
Test 9 Date 1-20-89
Stack dimen. 129 x 100 IN.
Barometric pressure 30.05 IN. HG.
Operators E. Rowbridge - M. Raehler
Probe length 120 IN.
Probe liner material: SS
*** Time start 1325 HRS
*** Time end 1430 HRS



Oxygen Traverse Data:

	* * * * * * * *		Oxygen (% v/v,d)		* * * * * * * *	
Point 8	16.2	17.0	15.8	16.0	15.7	15.7
Point 7	18.5	15.9	15.9	16.5	16.5	17.0
Point 6	16.4	15.8	15.9	15.6	15.6	15.5
Point 5	15.7	15.8	15.8	15.6	15.6	15.5
Point 4	15.7	15.9	16.5	15.6	15.6	15.5
Point 3	15.8	16.4	16.0	15.7	15.6	15.5
Point 2	17.6	16.0	16.0	15.7	15.7	15.6
Point 1	15.8	15.8	15.7	15.7	15.7	15.6
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: E 3
Point 2: E 4
Point 3: E 5
Point 4: E 6
Point 5: E 3
Point 6: E 4
Point 7: E 5
Point 8: E 6

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

5-420-41

24MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job: City of Fayetteville
Source: #01
Date: 1-20-89 Test: 9 Run: 1

Operator(s): E. Trowbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.08 IN. HG.
Ambient temp: Wet bulb 54 °F.
Dry bulb 58 °F.

Pre-Run Calibration: ~~40~~ 52

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	F-3	1448	2	3.2	15.2	61
2	F-4	1450	2	3.2	15.1	61
3	F-5	1452	2	3.0	15.0	60.5
4	F-6	1454	2	2.8	15.5	56
5	E-3	1457	2	3.2	15.1	61.5
6	E-4	1459	2	3.2	15.1	61
7	E-5	1501	2	3.2	15.1	60.5
8	E-6	1503	2	3.0	15.0	58.5
			Averages:	3.1	15.13	60

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.1 %	.1 %	±0.5 %
Mid-level CO2	3.4 %	.1 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

24 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 1
Date 1-20-89 Test 9 Run 2

Operator(s) E. Throwbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.08 IN. HG.
Ambient temp: Wet bulb 54 °F.
Dry bulb 58 °F.

~~1.3~~ ~~40~~ 52

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.89 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	F-3	1516	2	3.4	15.0	61
2	F-4	1518	2	3.4	15.0	60.5
3	F-5	1520	2	3.4	15.0	61
4	F-6	1522	2	3.2	14.9	60.5
5	E-3	1525	2	3.3	15.0	60
6	E-4	1527	2	3.3	15.0	60.5
7	E-5	1529	2	3.3	15.0	60.8
8	E-6	1531	2	3.2	14.9	61
			Averages:	3.31	14.97	60.66

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.8 ppm	.2 ppm	±2 ppm
Mid-level O2	13.0 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

24 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 1
Date 1-20-99 Test 2 Run 3

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.08 IN. HG.
Ambient temp: Wet bulb 54 °F.
Dry bulb 58 °F.

~~40~~ 52

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	F - 3	1544	2	3.4	15.3	60
2	F - 4	1546	2	3.4	15.3	60.5
3	F - 5	1548	2	3.4	15.3	60.9
4	F - 6	1550	2	3.2	15.2	61
5	E - 3	1553	2	3.3	15.3	61
6	E - 4	1555	2	3.3	15.3	61.5
7	E - 5	1557	2	3.3	15.3	61.5
8	E - 6	1559	2	3.2	15.2	61.6
			Averages:	3.3	15.28	61.0

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.1 ppm	.1 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.3 %	2 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX B

TURBINE 2 FIELD DATA SHEETS

INTERPOLL LABORATORIES
Stationary Gas Turbine NOx Determination
EPA Method 20-Preliminary Diluent Traverse
(Oxygen)

Turbine 2 Manuf. GE
Turbine S/N 244760
Test 20 Date 1-24-89
Stack dimen. 129 x 100 IN.
Barometric pressure 30.26 IN. HG.
Operators E. Trowbridge - M. Kaehler
Probe length 120 IN.
Probe liner material: SS
*** Time start 0832 HRS
*** Time end 0958 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * Oxygen (% v/v,d) * * * * * * * *					
Point 8	14.5	14.0	15.5	16.0	14.6	14.6
Point 7	14.5	14.0	15.3	16.0	14.6	14.5
Point 6	14.6	14.0	14.8	16.1	14.8	14.8
Point 5	14.9	14.0	14.5	16.1	14.9	14.8
Point 4	15.0	14.1	14.3	16.1	15.0	14.8
Point 3	15.1	14.1	14.2	16.0	15.1	14.8
Point 2	15.1	14.3	14.1	16.0	15.2	14.8
Point 1	15.2	14.4	14.1	15.9	15.3	14.8
	Port A	Port B	Port C	Port D	Port E	Port F

CHECKED O_2 CALIBRATION — OK

Selected Sampling Points for NOx Testing:

Point 1: B-3
Point 2: 4
Point 3: 5
Point 4: 6
Point 5: 7
Point 6: 8
Point 7: C-1
Point 8: 2

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

26 MW
0.1L

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source UNIT 2
Date 1-24-99 Test 30 Run 1

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.26 IN. HG.
Ambient temp: Wet bulb 42 °F.
Dry bulb 46 °F.

~~34~~ 32

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

49	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.46	% v/v CO_2	(Mid-level)	Vendor:	Linde
13.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-3	1034	2	3.3	15.3	64
2	B-4	1036	2	3.4	15.3	65
3	B-5	1038	2	3.4	15.3	66
4	B-6	1040	2	3.4	15.3	66.5
5	B-7	1042	2	3.4	15.3	67
6	B-8	1044	2	3.5	15.3	67.2
7	C-1	1047	2	3.4	15.6	67
8	C-2	1049	2	3.3	15.6	67
			Averages:	3.38	15.37	66.21

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.2 ppm	.2 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.3 %	.2 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source HOT
Date 1-24-89 Test 20 Run 2

Operator(s) E Trawbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.26 IN. HG.
Ambient temp: Wet bulb 44 °F.
Dry bulb 50 °F.

~~0.77~~ ~~22~~ 31

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
13.99 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-3	1105	2	3.2	14.8	63
2	B-4	1107	2	3.3	14.8	65
3	B-5	1109	2	3.3	14.8	64.8
4	B-6	1111	2	3.4	14.8	66.5
5	B-7	1113	2	3.4	14.9	67
6	B-8	1115	2	3.4	14.6	66.2
7	C-1	1118	2	3.3	15.1	66
8	C-2	1120	2	3.3	15.0	66
			Averages:	3.31	14.85	65.8

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 2
Date 1-24-89 Test 20 Run 3

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.26 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 59 °F.

~~0.9~~ ~~28~~ 38

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

46 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.42 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-3	1137	2	3.3	14.6	62.5
2	B-4	1139	2	3.4	14.6	64
3	B-5	1141	2	3.4	14.6	65
4	B-6	1143	2	3.5	14.6	66
5	B-7	1145	2	3.5	14.6	66.2
6	B-8	1147	2	3.5	14.6	66
7	C-1	1150	2	3.4	14.8	69
8	C-2	1152	2	3.4	14.8	65.8
			Averages:	3.42	14.65	65.56

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX C

TURBINE 3 FIELD DATA SHEETS

INTERPOLL LABORATORIES

Stationary Gas Turbine NOx Determination

EPA Method 20-Preliminary Diluent Traverse

(Oxygen)

Turbine 3 Manuf. GE

Turbine S/N 244441

Test 21 Date 1-24-89

Stack dimen. 129 x 100 IN.

Barometric pressure 30.30 IN. HG.

Operators ETLOWBRIDGE - M. KAENICL

Probe length 120 IN.

Probe liner material: SS

*** Time start 1331 HRS

*** Time end 1440 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * * Oxygen (% v/v,d) * * * * * * * * *					
Point 8	15.0	14.8	14.9	14.9	15.0	15.1
Point 7	15.0	14.8	14.9	14.9	14.8	15.0
Point 6	15.0	14.9	15.0	15.0	15.0	15.0
Point 5	15.0	14.9	15.0	15.0	15.0	15.1
Point 4	15.0	14.9	15.0	15.0	15.1	15.3
Point 3	15.0	14.8	15.0	15.0	15.2	15.3
Point 2	14.9	14.8	15.0	15.0	15.2	15.4
Point 1	15.2	15.2	15.1	15.2	15.3	15.4
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: B - 2
Point 2: B - 3
Point 3: B - 4
Point 4: B - 5
Point 5: B - 6
Point 6: B - 7
Point 7: B - 8
Point 8: E - 7

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

24 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 3
Date 1-24-99 Test 21 Run 2

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.30 IN. HG.
Ambient temp: Wet bulb 56 °F.
Dry bulb 68 °F.

~~34~~ 47

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
13.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-2	1452	2	3.2	14.8	67
2	B-3	1454	2	3.2	14.8	69.2
3	B-4	1456	2	3.3	14.7	69.5
4	B-5	1458	2	3.3	14.8	70
5	B-6	1500	2	3.3	14.7	70.5
6	B-7	1502	2	3.2	14.7	71.5
7	B-8	1504	2	3.2	14.8	72
8	E-7	1507	2	2.9	14.7	69
			Averages:	3.2	14.75	69.83

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

24 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 3
Date 1-24-99 Test 21 Run 2

Barometric pressure 30.30 IN. HG.
Ambient temp: Wet bulb 56 °F.
Dry bulb 68 °F.

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1
Condenser

~~1.1~~ ~~34~~ 47

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-2	1525	2	3.0	15.3	62
2	B-3	1527	2	3.0	15.1	65
3	B-4	1529	2	3.2	15.1	68
4	B-5	1531	2	3.2	15.1	68.3
5	B-6	1533	2	3.2	15.1	68.5
6	B-7	1535	2	3.0	15.0	68
7	B-8	1537	2	3.1	15.0	69.5
8	E-7	1543	2	2.8	15.2	65
			Averages:	3.06	15.11	66.78

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

24 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 3
Date 1-24-99 Test 31 Run 3

Operator(s) ETHRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.30 IN. HG.
Ambient temp: Wet bulb 56 °F.
Dry bulb 66 °F.

~~1.7~~ ~~37~~ 51

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-2	1555	2	3.1	15.0	65.2
2	B-3	1557	2	3.1	15.0	66.5
3	B-4	1559	2	3.2	15.0	69
4	B-5	1601	2	3.2	15.0	69
5	B-6	1603	2	3.2	14.8	70
6	B-7	1605	2	3.0	14.9	68
7	B-8	1607	2	3.1	14.9	69
8	E-7	1611	2	2.8	15.0	64.2
			Averages:	3.08	14.95	67.61

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX D

TURBINE 4 FIELD DATA SHEETS

INTERPOLL LABORATORIES
Stationary Gas Turbine NOx Determination
EPA Method 20-Preliminary Diluent Traverse
(Oxygen)

Turbine 4 Manuf. GE
Turbine S/N 244469
Test 22 Date 1-25-89
Stack dimen. 129 x 100 IN.
Barometric pressure 30.29 IN. HG.
Operators E. TRINGRIDGE
Probe length 120 IN.
Probe liner material: SS
*** Time start 0740 HRS
*** Time end 0850 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * Oxygen (% v/v,d) * * * * * * * *					
Point 8	14.3	14.0	14.0	14.3	14.4	14.7
Point 7	14.3	14.0	14.1	14.3	14.3	14.6
Point 6	14.3	14.0	14.2	14.3	14.3	14.5
Point 5	14.4	14.0	14.2	14.3	14.3	14.7
Point 4	14.4	14.0	14.2	14.3	14.4	14.7
Point 3	14.3	13.9	14.2	14.3	14.4	14.8
Point 2	14.3	13.9	14.3	14.3	14.4	14.8
Point 1	14.4	14.0	14.4	14.3	14.6	14.8
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: B-1
Point 2: B-2
Point 3: B-3
Point 4: B-4
Point 5: B-5
Point 6: B-6
Point 7: B-7
Point 8: B-8

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

26 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 4
Date 1-25-89 Test 22 Run 1

Operator(s) ETROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.29 IN. HG.
Ambient temp: Wet bulb 40 °F.
Dry bulb 46 °F.

~~0.8~~ ~~25~~ 26

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-1	0928	2	3.6	15.1	68.5
2	B-2	0930	2	3.5	15.0	67.5
3	B-3	0932	2	3.5	15.0	67.5
4	B-4	0934	2	3.5	15.0	68
5	B-5	0936	2	3.5	15.0	70
6	B-6	0938	2	3.5	15.0	72
7	B-7	0940	2	3.5	15.0	73
8	B-8	0942	2	3.4	14.8	73
			Averages:	3.5	14.98	69.93

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.2 %	.2 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 4
Date 1-25-99 Test 22 Run 2

Operator(s) E TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ■ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.29 IN. HG.
Ambient temp: Wet bulb 46 °F.
Dry bulb 52 °F.

~~28~~ 35

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-1	1006	2	3.4	15.0	67
2	B-2	1008	2	3.4	14.9	65
3	B-3	1010	2	3.4	14.9	64
4	B-4	1012	2	3.4	14.9	64
5	B-5	1014	2	3.4	14.9	65
6	B-6	1016	2	3.4	14.9	66.5
7	B-7	1018	2	3.4	14.7	66.8
8	B-8	1020	2	3.4	14.7	67
			Averages:	3.4	14.86	65.66

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	12.6 %	.9 %	±0.5 %
Mid-level CO2	3.5 %	0	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
O/L

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 4
Date 1-25-89 Test 22 Run 3

Operator(s) E. THOMBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.29 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 56 °F.

Moisture removal: Via Model MK-1 Condenser

~~1.0~~ ~~30~~ 43

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
13.44 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-1	1036	2	3.5	15.2	67.5
2	B-2	1038	2	3.5	15.2	66
3	B-3	1040	2	3.5	15.2	65
4	B-4	1042	2	3.5	15.2	65
5	B-5	1044	2	3.5	15.3	65.5
6	B-6	1046	2	3.4	15.2	66.5
7	B-7	1048	2	3.4	15.1	67
8	B-8	1050	2	3.3	15.0	67
			Averages:	3.45	15.17	66.18

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	-.1 ppm	.1 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.1 ppm	.1 ppm	±2 ppm
Mid-level O2	13.2 %	.2 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX E

TURBINE 6 FIELD DATA SHEETS

1
2 3 m 9

INTERPOLL LABORATORIES
Stationary Gas Turbine NOx Determination
EPA Method 20-Preliminary Diluent Traverse
(Oxygen)

Turbine 6 Manuf. GE
Turbine S/N 245194
Test 18 Date 1-23-89
Stack dimen. 120 x 100 IN.
Barometric pressure 30.24 IN. HG.
Operators E. Trowbridge - M. Kaemer
Probe length 120 IN.
Probe liner material: 25
*** Time start 0842 HRS
*** Time end 0947 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * - Oxygen (% v/v,d) * * * * * * * *					
Point 8	14.7	14.6	14.7	14.5	14.6	14.7
Point 7	14.7	14.6	14.7	14.5	14.5	14.7
Point 6	14.8	14.6	14.7	14.5	14.6	14.8
Point 5	14.8	14.6	14.7	14.5	14.6	14.8
Point 4	14.8	14.6	14.7	14.6	14.8	14.8
Point 3	14.8	14.6	14.7	14.6	14.8	14.8
Point 2	14.8	14.7	14.8	14.7	14.8	14.8
Point 1	15.0	14.7	14.8	14.7	14.8	14.9
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: D-3
Point 2: D-4
Point 3: D-5
Point 4: D-6
Point 5: D-7
Point 6: D-8
Point 7: E-7
Point 8: E-8

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 6
Date 1-23-89 Test 15 Run 1

Operator(s) E. [illegible]
CEMS: TECO Model 10 NO_x Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 47 °F.
Dry bulb 55 °F.

~~9.8~~ ~~25~~ 34

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	D-3	1017	2	3.5	14.6	61.8
2	D-4	1019	2	3.5	14.6	62.3
3	D-5	1021	2	3.5	14.6	63
4	D-6	1023	2	3.4	14.5	63
5	D-7	1025	2	3.3	14.5	63.5
6	D-8	1027	2	2.7	14.3	64
7	E-7	1030	2	3.3	14.5	65
8	E-8	1032	2	3.0	14.5	64.5
			Averages:	3.27	14.51	63.38

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO6
Date 1-23-99 Test 18 Run 2

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 47 °F.
Dry bulb 56 °F.

~~25~~ 18 33

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
13.44 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	D-3	1048	2	3.4	15.0	63.5
2	D-4	1050	2	3.4	15.0	63.5
3	D-5	1052	2	3.4	15.0	63.5
4	D-6	1054	2	3.3	15.0	64
5	D-7	1056	2	3.3	14.9	64.5
6	D-8	1058	2	3.0	14.8	65
7	E-7	1101	2	3.1	15.0	65.5
8	E-8	1103	2	3.1	15.0	65
			Averages:	3.25	14.96	64.31

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
O/L

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 6
Date 1-23-89 Test 1 Run 3

Operator(s) E. TRUMBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 48 °F.
Dry bulb 58 °F.

Moisture removal: Via Model MK-1 Condenser

~~0.8~~ ~~25~~ 33

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.89	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	D-3	1116	2	3.4	15.0	62
2	D-4	1118	2	3.4	15.0	62
3	D-5	1120	2	3.4	15.0	62.5
4	D-6	1122	2	3.3	14.9	63
5	D-7	1124	2	3.2	14.8	63.5
6	D-8	1126	2	3.0	14.6	65
7	E-7	1129	2	3.2	15.0	65
8	E-8	1131	2	3.2	14.9	64
			Averages:	3.26	14.9	63.37

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX F

TURBINE 5 FIELD DATA SHEETS

INTERPOLL LABORATORIES

Stationary Gas Turbine NOx Determination

EPA Method 20-Preliminary Diluent Traverse

(Oxygen)

Turbine 5 Manuf. GENERAL ELECTRIC

Turbine S/N 245095

Test 19 Date 1-23-89

Stack dimen. 129 x 100 IN.

Barometric pressure 30.24 IN. HG.

Operators E TRUMBLIDGE - M. KASNICK

Probe length 120 IN.

Probe liner material: SS

*** Time start 1443 HRS

*** Time end 1555 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * * Oxygen (% v/v,d) * * * * * * * * *					
Point 8	15.0	14.6	14.7	14.5	14.7	14.5
Point 7	14.9	14.8	14.8	14.8	14.7	14.6
Point 6	14.9	14.9	14.8	14.8	14.8	14.8
Point 5	15.0	14.9	14.8	14.8	14.8	14.8
Point 4	15.0	15.0	14.8	14.8	14.8	14.8
Point 3	15.0	15.0	14.9	14.8	14.8	14.8
Point 2	15.0	15.0	14.9	14.9	14.8	14.9
Point 1	15.0	15.1	15.0	15.0	15.0	14.9
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: B-8

Point 2: C 8

Point 3: D 8

Point 4: E 7

Point 5: E 8

Point 6: E 6

Point 7: F 7

Point 8: E 8

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 5
Date 1-23-99 Test 19 Run 1

Operator(s) E TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 52 °F.
Dry bulb 62 °F.

~~0.95~~ ~~29~~ 41

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.99 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-8	1619	2	3.2	14.7	62.5
2	C-8	1622	2	3.2	14.7	62.5
3	D-8	1626	2	3.0	14.6	62
4	E-7	1629	2	2.6	14.3	63
5	E-8	1631	2	2.7	14.4	62.5
6	F-6	1634	2	3.2	14.7	64
7	F-7	1636	2	3.0	14.5	63
8	F-8	1638	2	2.8	14.4	63
			Averages:	2.96	14.54	62.81

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	12.95 %	.4 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25M
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source HOS
Date 1-23-99 Test 19 Run 2

Operator(s) STROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 57 °F.
Dry bulb 62 °F.

0.95
29 41

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.99 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-8	1656	2	3.2	14.8	66
2	C-8	1659	2	3.2	14.8	66.2
3	D-8	1702	2	3.0	14.7	66
4	E-7	1705	2	3.1	14.6	67
5	E-8	1707	2	3.2	14.8	67
6	F-6	1710	2	3.1	14.8	67
7	F-7	1712	2	2.8	14.7	66
8	F-8	1714	2	2.7	14.5	66
			Averages:	3.03	14.71	66.4

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

25 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job City of Fayetteville
Source No 5
Date 1-23-99 Test 19 Run 3

Operator(s) Etheridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.24 IN. HG.
Ambient temp: Wet bulb 52 °F.
Dry bulb 60 °F.

~~1.05~~ ~~34~~ 42

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.99 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-8	1734	2	3.2	15.3	66
2	C-8	1737	2	3.2	15.3	66
3	D-8	1740	2	3.0	15.2	66
4	E-7	1743	2	3.0	15.3	66.5
5	E-8	1745	2	3.2	15.4	66.5
6	F-6	1748	2	3.2	15.4	68
7	F-7	1750	2	2.9	15.3	67
8	F-8	1752	2	2.8	15.1	67
			Averages:	3.06	15.28	66.62

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.0 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX G

TURBINE 7 FIELD DATA SHEETS

INTERPOLL LABORATORIES
Stationary Gas Turbine NOx Determination
EPA Method 20-Preliminary Diluent Traverse
(Oxygen)

Turbine 7 Manuf. General Electric
Turbine S/N 245225
Test 10 Date 1-21-89
Stack dimen. 129 x 100 IN.
Barometric pressure 30.56 IN. HG.
Operators Etrowbridge - McKaehler
Probe length 120 IN.
Probe liner material: SS
*** Time start 0900 HRS
*** Time end 1006 HRS

Flow Geometry

Oxygen Traverse Data:

	* * * * * * * * Oxygen (% v/v,d) * * * * * * * *					
Point 8	18.5	18.3	18.5	18.1	18.1	18.7
Point 7	18.5	18.3	18.6	18.1	18.5	18.7
Point 6	18.5	18.3	18.6	18.1	18.5	18.8
Point 5	18.5	18.3	18.6	18.2	18.5	18.8
Point 4	18.6	18.6	18.7	18.1	18.5	19.0
Point 3	18.6	18.6	18.7	18.6	18.6	18.5
Point 2	18.7	18.8	18.7	18.7	18.6	18.7
Point 1	18.8	18.9	18.7	18.8	18.8	18.8
	Port A	Port B	Port C	Port D	Port E	Port F

(Redo - 1st 3 port as plt went to Fuel oil.

Selected Sampling Points for NOx Testing:

Point 1: B-5
Point 2: 6
Point 3: D-4
Point 4: 5
Point 5: 6
Point 6: 7
Point 7: 8
Point 8: E-8

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

3 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 7
Date 1-21-99 Test 12 Run 1

Operator(s) E TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 34 °F.
Dry bulb 40 °F.

~~0.5~~ 17

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

45 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1139	2	1.2	18.5	13.0
2	B-6	1201	2	1.2	18.5	13.2
3	D-4	1204	2	1.2	18.5	13.6
4	D-5	1206	2	1.2	18.5	14
5	D-6	1208	2	1.2	18.5	14.4
6	D-7	1210	2	1.2	18.3	14.4
7	D-8	1212	2	1.2	18.3	14.5
8	E 8	1215	2	1.2	18.5	13
			Averages:	1.2	18.45	13.76

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	45.2 ppm	.2 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.4 %	.1 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source N17
Date 1-21-89 Test 10 Run 2

Operator(s) E THOMBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 36 °F.
Dry bulb 40 °F.

~~Q.7~~ ~~22~~ 24

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

45	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1227	2	1.2	18.7	12.8
2	B-6	1229	2	1.2	18.7	13
3	D-4	1232	2	1.2	18.8	13
4	D-5	1234	2	1.2	18.7	14
5	D-6	1236	2	1.2	18.7	14.2
6	D-7	1238	2	1.0	18.6	12.9
7	D-8	1240	2	1.0	18.6	14.1
8	E-8	1243	2	1.2	18.7	13.9
			Averages:	1.15	18.68	13.48

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 7
Date 1-21-89 Test 10 Run 3

Operator(s) E.T
CEMS: TECO Model 10 NOx Analyzer
Mode: ☐ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 36 °F.
Dry bulb 40 °F.

~~Q7~~ ~~22~~ 24

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

46	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	D-5	1253	2	1.2	18.7	11.5
2	B-6	1255	2	1.2	18.6	12.3
3	D-4	1258	2	1.2	18.7	12.7
4	D-5	1300	2	1.2	18.3	13.8
5	D-6	1302	2	1.2	18.3	14
6	D-7	1304	2	1.2	18.3	14.1
7	D-8	1306	2	1.1	18.3	14.2
8	E-8	1309	2	1.1	18.2	13.9
			Averages:	1.17	18.42	13.31

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	45.5 ppm	.8 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 9 Manufacturer GE
Test 11 Run 1 Date 1-21-89
Operator E TOWNBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	47.9	.1
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level	10.02	10.0		

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine #7 Manufacturer GE
Test 11 Run 2 Date 1-21-89
Operator E TROWBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine #7 Manufacturer GE
Test 11 Run 3 Date 1-21-89
Operator E TROWBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48.1	.1
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.98	13.0	13.1	.1
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job City of Fayetteville
Turbine 7 Manufacturer GE
Test 12 Run 1 Date 1-21-99
Operator E Trowbridge

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	48	0
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Mid level	3.49	3.5		
High level	10.02	10.0	10.0	0

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 7 Manufacturer GE
Test 12 Run 1 Date 1-21-89
Operator E THURBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	47.8	.2
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 7 Manufacturer GE
Test 12 Run 3 Date 1-21-88
Operator C TROWBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	12.9	.1
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

Interpoll Laboratories
(612)786-6020

Test 12
2 ong

Visible Emissions Form

SOURCE NAME	CITY OF FAYETTEVILLE
ADDRESS	
CITY	FAYETTEVILLE
STATE	NC
ZIP	
PHONE	
SOURCE ID NUMBER	N07
PROCESS EQUIPMENT	
OPERATING MODE	
CONTROL EQUIPMENT	
OPERATING MODE	
DESCRIBE EMISSION POINT	START STOP
HEIGHT ABOVE GROUND LEVEL	START STOP
HEIGHT RELATIVE TO OBSERVER	START STOP
DISTANCE FROM OBSERVER	START STOP
DIRECTION FROM OBSERVER	START STOP
DESCRIBE EMISSIONS	START None STOP None
EMISSION COLOR	START None STOP None
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☑ YES ☐	
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START No Plume STOP
DESCRIBE BACKGROUND	START Blue Sky STOP Blue Sky
BACKGROUND COLOR	START Blue STOP Blue
SKY CONDITIONS	START 50% clouds STOP 50% clouds
WIND SPEED	START 0-5 STOP N
WIND DIRECTION	START N STOP N
AMBIENT TEMP.	START 42 STOP 42
WET BULB TEMP.	40
RH.percent	

OBSERVATION DATE	START TIME	STOP TIME
1-21-89	1634	1640

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
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23					53				
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25					55				
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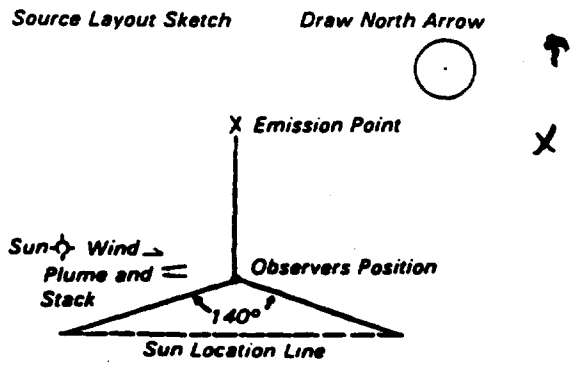
28					58				
29					59				
30					60				

Source Layout Sketch



AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	
RANGE OF OPACITY READINGS	MINIMUM MAXIMUM
OBSERVER'S NAME (PRINT)	E TRANBRIDGE
OBSERVER'S SIGNATURE	E Tranbridge
DATE	1-21-89
ORGANIZATION	Interpoll Labs
CERTIFIED BY	MPCA
DATE	5-4-88
VERIFIED BY	
DATE	

COMMENTS

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SIGNATURE

TITLE | DATE

S-0079R

29 ~~8~~ MW
~~NG~~ OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source #07
Date 1-21-89 Test 13 Run L
PEAK LOAD - FUEL OIL
Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 35 °F.
Dry bulb 40 °F.

Operator(s) E TRUMBLEDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

~~0.68~~ ~~29~~ 21

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor: Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor: Linde
12.99	% v/v O_2	(Mid-level)	Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1707	2	3.4	15.0	75
2	B-6	1709	2	3.4	15.0	76.8
3	D-4	1712	2	3.5	15.0	76.5
4	D-5	1714	2	3.5	15.0	76.5
5	D-6	1716	2	3.4	15.0	76.0
6	D-7	1718	2	3.0	14.8	76.0
7	D-8	1720	2	3.2	14.9	74
8	E-8	1723	2	3.2	14.9	77
			Averages:	3.32	14.95	75.97

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

29 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 7
Date 1-21-89 Test 13 Run 2

Operator(s) E.T
CEMS: TECO Model 10 NOx Analyzer
Mode: ☐ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 34 °F.
Dry bulb 40 °F.

~~18~~ 18

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1734	2	3.4	15.1	73
2	B-6	1736	2	3.4	15.0	74
3	D-4	1739	2	3.4	15.0	75
4	D-5	1741	2	3.4	14.8	75
5	D-6	1743	2	3.4	14.8	75
6	D-7	1745	2	3.2	14.8	75
7	D-8	1747	2	3.0	14.8	75
8	E-8	1750	2	3.2	14.8	76.5
			Averages:	3.3	14.88	74.81

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.9 ppm	.1 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.4 %	.1 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

29 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO7
Date 1-21-99 Test 13 Run 3

Operator(s) ET
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.56 IN. HG.
Ambient temp: Wet bulb 35 °F.
Dry bulb 42 °F.

0.65
~~20~~ 21

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1806	2	3.4	15.0	75.8
2	B-6	1808	2	3.4	15.0	76
3	D-4	1811	2	3.6	14.8	76.5
4	D-5	1813	2	3.6	14.8	76.5
5	D-6	1815	2	3.5	14.8	77
6	D-7	1818	2	3.2	14.7	78
7	D-8	1820	2	3.4	14.7	78
8	E-8	1823	2	3.4	15.0	77.5
			Averages:	3.43	14.85	76.91

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	45 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 7 Manufacturer GE
Test 14 Run 1 Date 1-22-89
Operator ET

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	48	0
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level	10.02	10.0		

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 7 Manufacturer GE
Test 14 Run 2 Date 1-22-99
Operator EJ

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 2 Manufacturer GE
Test 14 Run 3 Date 1-22-99
Operator E. Trowbridge

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

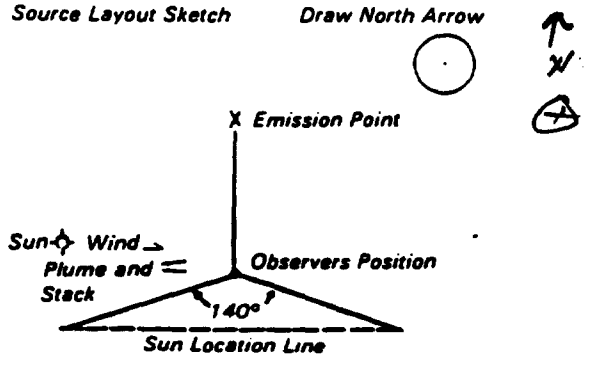
Test 14

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

SOURCE NAME	CITY OF FAYETTEVILLE
ADDRESS	
CITY	FAYETTEVILLE
STATE	NC
ZIP	
PHONE	
SOURCE ID NUMBER	NO 7
PROCESS EQUIPMENT	
OPERATING MODE	
CONTROL EQUIPMENT	
OPERATING MODE	PEAK LOAD
DESCRIBE EMISSION POINT	START STOP
HEIGHT ABOVE GROUND LEVEL	START 60' STOP
HEIGHT RELATIVE TO OBSERVER	START STOP
DISTANCE FROM OBSERVER	START 100' STOP
DIRECTION FROM OBSERVER	START STOP
DESCRIBE EMISSIONS	START NONE STOP NONE
EMISSION COLOR	START NONE STOP NONE
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	NO ☑ YES ☐
IF WATER DROPLET PLUME:	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START STOP
DESCRIBE BACKGROUND	START Lite Gray Clouds STOP
BACKGROUND COLOR	START Lite Gray STOP
SKY CONDITIONS	START 70% cloudy STOP 70% cloudy
WIND SPEED	START 10 STOP 10
WIND DIRECTION	START N STOP N
AMBIENT TEMP.	START 40 STOP 40
WET BULB TEMP.	36
RH, percent	

Source Layout Sketch



OBSERVATION DATE	START TIME	STOP TIME
1-22-89	1114	1120

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

AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE % WERE	
RANGE OF OPACITY READINGS	MINIMUM MAXIMUM
OBSERVER'S NAME (PRINT)	E TROWBRIDGE
OBSERVER'S SIGNATURE	E Trowbridge
DATE	1-22-89
ORGANIZATION	INTERPOLL LABS
CERTIFIED BY	MPCA
DATE	5-4-88
VERIFIED BY	
DATE	

COMMENTS

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SIGNATURE

TITLE | DATE

S-0079R

20 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 7
Date 1-22-99 Test 15 Run 1

Operator(s) E. Throwbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.52 IN. HG.
Ambient temp: Wet bulb 36 °F.
Dry bulb 40 °F.

Moisture removal: Via Model MK-1 Condenser

0.75 ~~23~~ 23

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.99	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1142	2	1.9	16.3	32
2	B-6	1144	2	1.9	16.0	32.5
3	D-4	1147	2	2.0	16.5	34
4	D-5	1149	2	2.0	16.5	33.5
5	D-6	1151	2	2.0	16.2	33
6	D-7	1153	2	1.8	16.0	33.9
7	D-8	1155	2	1.8	16.0	34
8	E-8	1158	2	1.9	16.2	34
			Averages:	1.91	16.21	33.36

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
NG.

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NOT
Date 1-22-99 Test 15 Run 2

Operator(s) ETROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.52 IN. HG.
Ambient temp: Wet bulb 35 °F.
Dry bulb 42 °F.

Moisture removal: Via Model MK-1 Condenser

~~0.6~~ ~~18~~ 18

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.99 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1210	2	1.9	16.6	33.5
2	B-6	1212	2	1.9	16.6	34
3	D-4	1215	2	2.0	16.7	34
4	D-5	1217	2	2.0	16.7	33.5
5	D-6	1219	2	1.9	16.7	33
6	D-7	1221	2	1.8	16.6	33
7	D-8	1223	2	1.8	16.5	33.5
8	E-8	1225	2	1.8	17.0	33
			Averages:	1.88	16.67	33.43

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
N.G.

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 4
Date 1-22-99 Test 15 Run 3

Operator(s) E. Thompson
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.52 IN. HG.
Ambient temp: Wet bulb 35 °F.
Dry bulb 42 °F.

~~0.6~~ ~~18~~ 18

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.98 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1240	2	1.9	16.8	33
2	B-6	1242	2	1.9	16.8	33.5
3	D-4	1245	2	2.0	16.3	33.5
4	D-5	1247	2	1.9	16.3	33.5
5	D-6	1249	2	1.9	16.2	33.5
6	D-7	1251	2	1.8	16.0	33.7
7	D-8	1253	2	1.8	16.0	34
8	E-8	1256	2	1.8	16.3	34
			Averages:	1.87	16.33	33.58

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.1 ppm	.1 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 7 Manufacturer GE
Test 16 Run 1 Date 1-22-89
Operator EF

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	48.2	.2
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	.0
High level	10.02	10.0		

S-420-6

11 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine #07 Manufacturer GE
Test 16 Run 3 Date 1-22-89
Operator EF

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	49.3	.3
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 2 Manufacturer GE
Test 1A Run 3 Date 1-22-99
Operator E. Trowbridge

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	.2	.2
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

Interpoll Laboratories
(612)786-6020

Test 16

Visible Emissions Form

SOURCE NAME: CITY OF FAYETTEVILLE	OBSERVATION DATE: 1-22-89	START TIME: 1515	STOP TIME: 1521
ADDRESS			
CITY: FAYETTEVILLE	STATE: NC	ZIP	
PHONE	SOURCE ID NUMBER: No 7		
PROCESS EQUIPMENT	OPERATING MODE		
CONTROL EQUIPMENT: WATER INJECTION	OPERATING MODE: 11MS GAS		
DESCRIBE EMISSION POINT			
START	STOP		
HEIGHT ABOVE GROUND LEVEL: START 60 STOP	HEIGHT RELATIVE TO OBSERVER: START STOP		
DISTANCE FROM OBSERVER: START 100' STOP	DIRECTION FROM OBSERVER: START STOP		
DESCRIBE EMISSIONS: START NONE	STOP NONE		
EMISSION COLOR: START NONE STOP NONE	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐		
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED			
START	STOP		
DESCRIBE BACKGROUND: START GRAY SKY	STOP Same		
BACKGROUND COLOR: START GRAY SKY STOP Same	SKY CONDITIONS: START STOP		
WIND SPEED: START 10 STOP 10	WIND DIRECTION: START N STOP N		
AMBIENT TEMP.: START 40 STOP 40	WET BULB TEMP.: 40	RH.percent	

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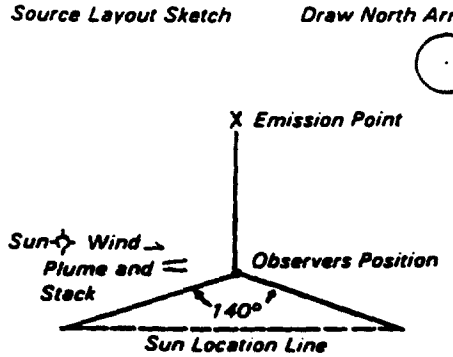
27					57				
28					58				
29					59				
30					60				

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS: MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): E Trowbridge	
OBSERVER'S SIGNATURE: E Trowbridge	DATE: 1-22-89
ORGANIZATION: Interpoll Labs	
CERTIFIED BY: [illegible]	DATE: 5-4-88
VERIFIED BY	DATE

COMMENTS	
I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS SIGNATURE	
TITLE	DATE

S-0079R

3 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO7
Date 1-22-89 Test 12 Run 1

Operator(s) E. TRUMBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.50 IN. HG.
Ambient temp: Wet bulb 41 °F.
Dry bulb 41 °F.

~~28~~ 26

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1542	2	.8	18.2	14
2	B-6	1544	2	.8	18.2	15
3	D-4	1547	2	.8	18.3	15.2
4	D-5	1549	2	.8	18.3	15.3
5	D-6	1551	2	.8	18.3	15.5
6	D-7	1553	2	.8	18.2	15.5
7	D-8	1555	2	.8	18.2	15.6
8	E-8	1558	2	.8	18.3	15.5
			Averages:	.8	18.25	15.2

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	.2 ppm	.2 ppm	±2 ppm
Zero O2	.2 %	.2 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.2 ppm	.2 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source N07
Date 1-22-99 Test 17 Run 2

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.50 IN. HG.
Ambient temp: Wet bulb 42 °F.
Dry bulb 47 °F.

~~0.95~~ ~~27~~ 30

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.42 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1609	2	.9	18.9	16
2	B-6	1611	2	.9	18.9	16.2
3	D-4	1614	2	.8	19.0	16
4	D-5	1616	2	.8	19.0	16
5	D-6	1619	2	.8	19.0	16
6	D-7	1622	2	.8	18.9	16
7	D-8	1625	2	.8	18.9	16
8	E-8	1628	2	.8	19.0	16
			Averages:	.82	18.95	16.02

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.2 ppm	.2 ppm	±2 ppm
Mid-level O2	13.1 %	.1 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NG7
Date 1-22-89 Test 17 Run 3

Operator(s) E TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.50 IN. HG.
Ambient temp: Wet bulb 42 °F.
Dry bulb 46 °F.

~~30~~ 32

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	B-5	1637	2	.8	18.8	15
2	B-6	1639	2	.8	18.8	16
3	D-4	1642	2	.9	19.0	16
4	D-5	1644	2	.9	19.0	16
5	D-6	1646	2	.9	19.0	16
6	D-7	1648	2	.9	19.0	16
7	D-8	1650	2	.9	19.9	16
8	E-8	1653	2	.8	19.0	15.8
			Averages:	.86	19.93	15.85

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

APPENDIX H

TURBINE 8 FIELD DATA SHEETS

Note: Test 5 was invalidated by the plant when it was noted that the water injection had been turned off. Test 23 replaces Test 5.

INTERPOLL LABORATORIES

Stationary Gas Turbine NOx Determination

EPA Method 20-Preliminary Diluent Traverse

(Oxygen)

Turbine 8 Manuf. General Electric

Turbine S/N 245226

Test 1 Date 1-18-89

Stack dimen. 129 x 140 IN.

Barometric pressure 30.35 IN. HG.

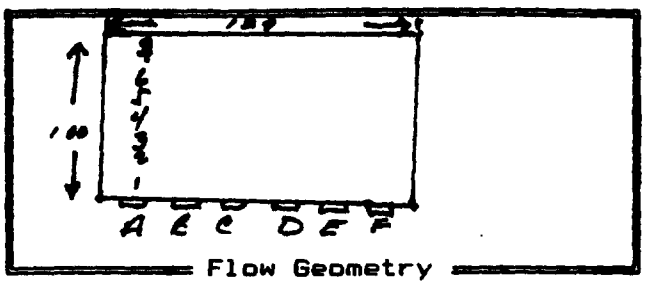
Operators E.Throwbridge - M.Karnik

Probe length 120 IN.

Probe liner material: SS

*** Time start 1404 HRS

*** Time end 1502 HRS



Oxygen Traverse Data:

	* * * * * * * * Oxygen (% v/v,d) * * * * * * * *					
Point 8	18.7	18.6	18.7	18.7	18.6	18.7
Point 7	18.7	18.5	18.5	18.5	18.5	18.7
Point 6	18.6	18.5	18.5	18.5	18.5	18.5
Point 5	18.6	18.5	18.5	18.5	18.6	18.6
Point 4	18.6	18.6	18.5	18.5	18.6	18.6
Point 3	18.6	18.6	18.5	18.6	18.6	18.6
Point 2	18.7	18.6	18.6	18.6	18.6	18.7
Point 1	18.7	18.7	18.6	18.7	18.7	18.7
	Port A	Port B	Port C	Port D	Port E	Port F

Selected Sampling Points for NOx Testing:

Point 1: C-4
Point 2: C-5
Point 3: C-6
Point 4: C-7
Point 5: D-4
Point 6: D-5
Point 7: D-6
Point 8: D-7

1. *Use the same measurement system for this set of measurements as that used for the NOx determinations. System must be calibrated prior to the start of the traverse and the calibration checked after the traverse is completed. Use the Mid-level oxygen span gas for this check.*
2. *After the traverse is complete and the calibration verified, select the 8 traverse points with the lowest oxygen levels and record above.*

S-420-41

27 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source UNIT NO. 8
Date 1-18-89 Test 1 Run 1

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.35 IN. HG.
Ambient temp: Wet bulb 46 °F.
Dry bulb 58 °F.

~~0.65~~ ~~20~~ 26

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1650	2	2.4	15.5	61
2	C-5	1655	2	2.3	15.6	59
3	C-6	1658	2	2.3	15.6	61
4	C-7	1700	2	2.3	15.6	61
5	D-4	1704	2	2.4	15.6	63.9
6	D-5	1706	2	2.4	15.6	60
7	D-6	1708	2	2.3	15.6	60
8	D-7	1710	2	2.2	15.5	62
			Averages:	2.32	15.57	60.98

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.5 ppm	-.5 ppm	±2 ppm
Mid-level O2	13.06 %	.05 %	±0.5 %
Mid-level CO2	3.49 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

27 MW
NG.

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 8
Date 1-18-99 Test 1 Run 2

Operator(s) E. Throwbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.35 IN. HG.
Ambient temp: Wet bulb 47 °F.
Dry bulb 58 °F.

~~27~~ 30

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
13.0 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1740	2	2.5	15.2	64
2	C-5	1742	2	2.5	15.2	64
3	C-6	1744	2	2.5	15.1	~~64~~
4	C-7	1746	2	2.5	15.1	65
5	D-4	1749	2	2.4	15.2	65.9
6	D-5	1751	2	2.4	15.2	64.3
7	D-6	1753	2	2.4	15.1	65
8	D-7	1755	2	2.3	15.0	64.5
			Averages:	2.43	15.13	64.83

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	10 %	0 %	±0.5 %
Mid-level CO2	3.4 %	.1 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

27MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source UNIT NO. 8
Date 1-18-89 Test 1 Run 3

Barometric pressure 30.35 IN. HG.
Ambient temp: Wet bulb 48 °F.
Dry bulb 54 °F.

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

~~0.99~~ ~~29~~ 39

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1825	2	2.6	15.2	64
2	C-5	1827	2	2.6	15.0	64
3	C-6	1829	2	2.6	15.0	64
4	C-7	1831	2	2.6	15.0	64
5	D-4	1834	2	2.5	15.3	64.6
6	D-5	1836	2	2.6	15.1	64.2
7	D-6	1838	2	2.6	15.1	64.2
8	D-7	1840	2	2.4	15.0	67
			Averages:	2.56	15.08	64.5

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.5 ppm	.5 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.49 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine NO 3 Manufacturer GE
Test 2 Run 1 Date 1-19-89
Operator E. TRUMBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	15.9		
Mid level	48	48	48	0
High level	86	87		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Mid level	3.49	3.5		
High level	10.02	10.00	10.0	0

S-420-6

27 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job City of Fayetteville
Turbine 1 Manufacturer GE
Test 2 Run 2 Date 5-18-89
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Mid level	3.49	3.5		
High level	10.02	10.0	10.0	0

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job City of Fayetteville
Turbine 8 Manufacturer GE
Test 2 Run 3 Date 1-19-89
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level	20.9	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level	10.02	10.0		

S-420-6

TEST 2

Interpoll Inc.
(612)786-6020

Visible Emissions Form

SOURCE NAME: CITY OF FAYETTEVILLE	OBSERVATION DATE: 1-19-89	START TIME: 1151	STOP TIME: 1157
ADDRESS			
CITY: FAYETTEVILLE	STATE: NC	ZIP	
PHONE	SOURCE ID NUMBER: NO 8		
PROCESS EQUIPMENT	OPERATING MODE		
CONTROL EQUIPMENT	OPERATING MODE: FUEL OIL		
DESCRIBE EMISSION POINT START	STOP		
HEIGHT ABOVE GROUND LEVEL START 60' STOP 60'	HEIGHT RELATIVE TO OBSERVER START	STOP	
DISTANCE FROM OBSERVER START 100' STOP 100'	DIRECTION FROM OBSERVER START	STOP	
DESCRIBE EMISSIONS START None	STOP NONE		
EMISSION COLOR START None STOP	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐		
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START No Plume	STOP		
DESCRIBE BACKGROUND START 60% Cloudy	STOP		
BACKGROUND COLOR START Blue Sky STOP SAME	SKY CONDITIONS START 60% clouds STOP SAME		
WIND SPEED START 0 STOP 0	WIND DIRECTION START — STOP —		
AMBIENT TEMP. START 60 STOP 60	WET BULB TEMP.	RH, percent	

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
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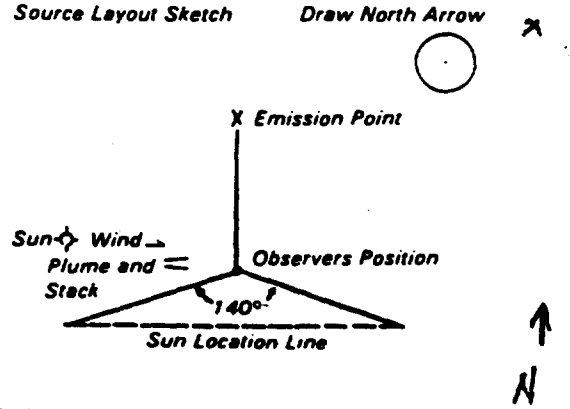
30					60				

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): E. TROWBRIDGE	
OBSERVER'S SIGNATURE: E Trowbridge	DATE: 1-19-89
ORGANIZATION: INTERPOLL LABS	
CERTIFIED BY: MPCA	DATE: 5-4-88
VERIFIED BY	DATE

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE — DATE

S-0079R

20 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source HO 8
Date 1-19-89 Test 3 Run 1

Operator(s) E Trawhedy
CEMS: TECO Model 10 NOx Analyzer
Mode: ☑ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.28 IN. HG.
Ambient temp: Wet bulb 54 °F.
Dry bulb 60 °F.

Moisture removal: Via Model MK-1 Condenser

~~1.2~~ ~~37~~ 52

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1225	2	2.7	15.8	47.9
2	C-5	1227	2	2.5	15.8	46
3	C-6	1229	2	2.5	15.8	47.9
4	C-7	1231	2	2.3	15.8	47.9
5	D-4	1234	2	2.6	15.9	48.3
6	D-5	1236	2	2.5	15.8	48
7	D-6	1238	2	2.4	15.9	48.2
8	D-7	1240	2	1.9	16.4	40.8
			Averages:	2.42	15.9	46.87

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.0 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
O/L

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job City of Fayetteville
Source NO8
Date 1-19-89 Test 3 Run 2

Operator(s) [illegible]
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.28 IN. HG.
Ambient temp: Wet bulb 55 °F.
Dry bulb 62 °F.

1.25
~~48~~ 38
52

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
5.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

Traverse Point		Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1302	2	2.5	16.0	43.9
2	C-5	1304	2	2.5	16.0	44.4
3	C-6	1306	2	2.5	16.0	45
4	C-7	1308	2	2.2	16.5	41.9
5	D-4	1311	2	2.5	16.0	49
6	D-5	1313	2	2.4	16.0	47.8
7	D-6	1315	2	2.4	16.1	46
8	D-7	1317	2	2.1	15.8	46
			Averages:	2.38	16.05	45.5

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	5.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source HRS
Date 1-19-89 Test 3 Run 3

Barometric pressure 30.28 IN. HG.
Ambient temp: Wet bulb 56 °F.
Dry bulb 64 °F.

Operator(s) E Trowbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

~~1.3~~ ~~40~~ 52

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1335	2	2.4	16.0	44.2
2	C-5	1337	2	2.3	16.0	45
3	C-6	1339	2	2.3	16.0	46
4	C-7	1341	2	2.2	16.2	43
5	D-4	1345	2	2.6	15.9	47.1
6	D-5	1347	2	2.6	15.9	46.4
7	D-6	1349	2	2.5	15.9	46
8	D-7	1351	2	1.7	16.6	35.8
			Averages:	2.32	16.07	44.18

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.04 %	.04 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 8 Manufacturer GE
Test 4 Run 1 Date 1-18-99
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	48	0
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.00	13.0	0
High level	20.99	21.0		

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Mid level	3.49	3.5		
High level	10.02	10.0	10.0	0

S-420-6

11 MW
OIL

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 1 Manufacturer GE
Test 1 Run 2 Date 1-19-99
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 8 Manufacturer GE
Test 4 Run 3 Date 1-14-89
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48	0
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

Interpoll Inc.
(612)786-6020

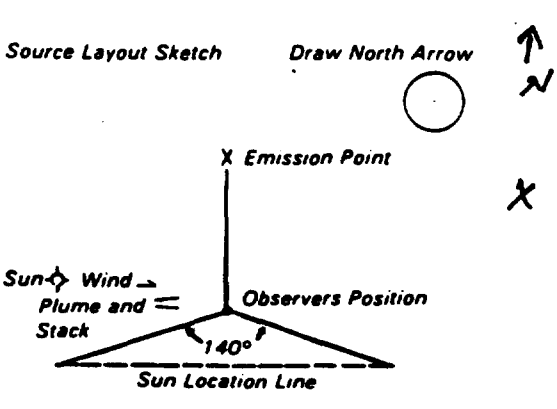
Test 4

Visible Emissions Form

SOURCE NAME: CITY OF FAYETTEVILLE	OBSERVATION DATE: 1-19-89	START TIME: 1548	STOP TIME: 1554
ADDRESS			
CITY: FAYETTEVILLE	STATE: NC	ZIP	
PHONE	SOURCE ID NUMBER: No 8		
PROCESS EQUIPMENT	OPERATING MODE		
CONTROL EQUIPMENT: with Injection	OPERATING MODE: 40% Fuel Oil		
DESCRIBE EMISSION POINT			
START	STOP		
HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER		
START 60'	STOP	START	STOP
DISTANCE FROM OBSERVER	DIRECTION FROM OBSERVER		
START 100'	STOP 100'	START E	STOP E
DESCRIBE EMISSIONS			
START None	STOP None		
EMISSION COLOR	PLUME TYPE: CONTINUOUS ☐		
START None	STOP None	FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT:	IF WATER DROPLET PLUME:		
NO ☒ YES ☐	ATTACHED ☐ DETACHED ☐		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED			
START No Plume	STOP No Plume		
DESCRIBE BACKGROUND			
START Blue Sky	STOP Same		
BACKGROUND COLOR	SKY CONDITIONS		
START Blue Sky	STOP	START 60% cloudy	STOP 60% cloudy
WIND SPEED	WIND DIRECTION		
START 0-5	STOP 0-5	START NE	STOP NE
AMBIENT TEMP	WET BULB TEMP	RH.percent	
START 62	STOP 62		

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

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS: MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): E Trowbridge	
OBSERVER'S SIGNATURE: E Trowbridge	DATE: 1-19-89
ORGANIZATION: Interpoll Labs	
CERTIFIED BY: NRA	DATE: 5- -88
VERIFIED BY	DATE

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE | DATE

S-0079R

20 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NOX
Date 1-20-99 Test 6 Run 1

Operator(s) EITRWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 48 °F.
Dry bulb 52 °F.

~~30~~ ~~39~~ 42

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	0748	2	1.8	17.0	31
2	C-5	0750	2	1.8	16.9	30
3	C-6	0752	2	1.8	16.8	32
4	C-7	0754	2	1.5	17.1	27.8
5	D-4	0757	2	1.8	16.8	32.8
6	D-5	0759	2	1.8	16.8	31.7
7	D-6	0801	2	1.8	16.8	31.7
8	D-7	0803	2	1.3	17.7	23.7
			Averages:	1.7	16.98	30.08

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.7 ppm	.3 ppm	±2 ppm
Mid-level O2	13.4 %	.4 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 8
Date 1-20-89 Test 6 Run 2

Operator(s) E. TRAWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 49 °F.
Dry bulb 54 °F.

415

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
13.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	0824	2	1.9	16.2	28.5
2	C-5	0826	2	1.8	16.2	29.6
3	C-6	0828	2	1.8	16.2	31
4	C-7	0830	2	1.5	16.5	24.8
5	D-4	0833	2	1.9	16.2	33.5
6	D-5	0835	2	1.9	16.2	31
7	D-6	0837	2	1.9	16.2	31.2
8	D-7	0839	2	1.3	16.7	24.8
			Averages:	1.75	16.3	29.65

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.8 %	.1 %	±0.5 %
Mid-level CO2	3.3 %	.2 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

20 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 9
Date 1-30-99 Test 6 Run 3

Operator(s) E.T
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 54 °F.

48

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	0855	2	1.8	16.3	29.8
2	C-5	0857	2	1.8	16.3	30
3	C-6	0859	2	1.8	16.3	31
4	C-7	0901	2	1.6	16.2	31
5	D-4	0904	2	1.7	16.4	30.2
6	D-5	0906	2	1.6	16.3	29.8
7	D-6	0908	2	1.4	16.3	28.5
8	D-7	0910	2	1.0	16.5	23
			Averages:	1.59	16.32	29.16

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

** Average steady-state values from recorder or instrument readout.* S-420-1

11 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job City of Fayetteville
Source No 8
Date 1-20-89 Test 7 Run 1

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 55 °F.

Operator(s) E. Trowbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

~~1.08~~ ~~3R~~ 44

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	0937	2	1.4	17.6	29.5
2	C-5	0939	2	1.4	17.6	30
3	C-6	0941	2	1.3	17.5	29.5
4	C-7	0943	2	1.3	17.5	30
5	D-4	0946	2	1.4	17.6	31.5
6	D-5	0948	2	1.4	17.5	31
7	D-6	0950	2	1.4	17.5	31
8	D-7	0952	2	1.1	17.4	26
			Averages:	1.33	17.52	29.81

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	12.95 %	.04 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

11 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 8
Date 1-20-89 Test 2 Run 2

Operator(s) E. Trombridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 55 °F.

Moisture removal: Via Model MK-1 Condenser

~~1.05~~ ~~32~~ 44

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1006	2	1.4	17.5	32
2	C-5	1008	2	1.4	17.5	32
3	C-6	1010	2	1.4	17.5	32
4	C-7	1012	2	1.3	17.5	30.8
5	D-4	1015	2	1.4	17.5	32.1
6	D-5	1017	2	1.4	17.5	32
7	D-6	1019	2	1.2	17.5	31
8	D-7	1021	2	1.0	17.5	25.5
			Averages:	1.31	17.5	30.92

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	.1 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

11 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 8
Date 1-20-89 Test 7 Run 3

Operator(s) E. TROWBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 50 °F.
Dry bulb 55 °F.

1.05
3.2
44

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.89 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1037	2	1.4	17.3	31.5
2	C-5	1039	2	1.4	17.3	31
3	C-6	1041	2	1.4	17.3	31.5
4	C-7	1043	2	1.3	17.3	29
5	D-4	1046	2	1.4	17.4	32.5
6	D-5	1048	2	1.4	17.4	32
7	D-6	1050	2	1.4	17.4	31.5
8	D-7	1052	2	1.2	17.5	24.5
			Averages:	1.36	17.36	30.43

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48.2 ppm	.2 ppm	±2 ppm
Mid-level O2	12.6 %	.4 %	±0.5 %
Mid-level CO2	3.49 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 8
Date 1-20-99 Test 8 Run 1

Operator(s) E. THOMBRIDGE
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 51 °F.
Dry bulb 56 °F.

~~DA~~ ~~BA~~ 47

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C-4	1129	2	.8	18.5	10.5
2	C-5	1131	2	.8	18.5	12
3	C-6	1133	2	.8	18.5	13
4	C-7	1135	2	.75	18.4	12
5	D-4	1138	2	.8	18.5	13.5
6	D-5	1140	2	.9	18.5	14.2
7	D-6	1142	2	.9	18.5	14.3
8	D-7	1144	2	.6	18.5	11
			Averages:	.79	18.48	12.56

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	49 ppm	1 ppm	±2 ppm
Mid-level O2	13 %	0 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source NO 9
Date 1-20-99 Test 8 Run 2

Operator(s) E. Throckmorton
CEMS: TECO Model 10 NOx Analyzer
Mode: [x] NO_x [ ] NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 51 °F.
Dry bulb 56 °F.

~~BG~~ 47

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48	ppm NO	(Mid-level)	Vendor:	Scott Specialty Gas
3.49	% v/v CO_2	(Mid-level)	Vendor:	Linde
12.99	% v/v O_2	(Mid-level)	Vendor:	Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* [ ] CO_2	[ ] O_2	NO_x * (ppm,d)
1	C-4	1200	2	.8	18.3	11
2	C-5	1202	2	.8	18.3	12
3	C-6	1204	2	.8	18.3	13
4	C-7	1206	2	.7	18.4	11
5	D-4	1209	2	.8	18.4	13.8
6	D-5	1211	2	.9	18.4	14
7	D-6	1213	2	.9	18.4	14
8	D-7	1215	2	.6	18.4	10
			Averages:	.78	18.36	12.35

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	47.5 ppm	.5 ppm	±2 ppm
Mid-level O2	13.1 %	.1 %	±0.5 %
Mid-level CO2	3.5 %	0 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

3 MW
NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Sample Point Record

Job CITY OF FAYETTEVILLE
Source No 8
Date 1-20-99 Test 8 Run 3

Operator(s) G Trowbridge
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

Barometric pressure 30.12 IN. HG.
Ambient temp: Wet bulb 52 °F.
Dry bulb 52 °F.

~~14~~ ~~38~~ 50

Pre-Run Calibration:

Instruments zeroed and spanned prior to start of run with zero gas and

48 ppm NO (Mid-level) Vendor: Scott Specialty Gas
3.49 % v/v CO_2 (Mid-level) Vendor: Linde
12.99 % v/v O_2 (Mid-level) Vendor: Linde

	Traverse Point	Time (HRS)	Time at Point (min.)	Diluent (% v/v,d)* ☐ CO_2	☐ O_2	NO_x * (ppm,d)
1	C.4	1228	2	.8	18.5	11
2	C-5	1230	2	.8	18.5	12
3	C-6	1232	2	.8	18.5	13
4	C-7	1234	2	.8	18.5	11.8
5	D-4	1237	2	.8	18.6	13
6	D-5	1239	2	.8	18.5	13.5
7	D-6	1241	2	.8	18.5	13.9
8	D-7	1243	2	.6	18.5	10
			Averages:	.77	18.51	12.27

Post-Run Calibration Check:

Standard Gas	Final Reading	Drift	Allowed Drift
Zero NO	0 ppm	0 ppm	±2 ppm
Zero O2	0 %	0 %	±0.5 %
Zero CO2	0 %	0 %	±0.4 %
Mid-level NO	48 ppm	0 ppm	±2 ppm
Mid-level O2	13.1 %	.1 %	±0.5 %
Mid-level CO2	3.4 %	.4 %	±0.4 %

* *Average steady-state values from recorder or instrument readout.* S-420-1

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 8 Manufacturer GE
Test 23 Run 1 Date 12-25-99
Operator E TROWBRIDGE

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level	16	16		
Mid level	48	48	48.2	.2
High level	86	86		

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.3	.3
High level	20.99			

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Mid level	3.49	3.5		
High level	10.02	10.00	10.0	0

S-420-6

3 MW
Oil + NG

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 3 Manufacturer GE
Test 23 Run 2 Date 10-25-89
Operator [illegible]

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48.0	47.8	.2
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13.0	13.0	0
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

INTERPOLL LABORATORIES
Stationary Gas Turbine NO_x Determination
EPA Method 20-Zero & Calibration Data

Job CITY OF FAYETTEVILLE
Turbine 5 Manufacturer GE
Test 23 Run 3 Date 1-23-89
Operator E.T

NO_x Calibration:

***	Cylinder Value (ppm)	Analyzer Response (ppm)		Difference Final-Initial (ppm)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	48	48	48.1	.1
High level				

Oxygen Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	12.99	13	13.2	.2
High level				

CO2 Calibration:

***	Cylinder Value (%)	Analyzer Response (%)		Difference Final-Initial (%)
		Pre-Run	Post-Run	
Zero gas	0	0	0	0
Low level				
Mid level	3.49	3.5	3.5	0
High level				

S-420-6

APPENDIX I

GAS ANALYZERS SPECIFICATIONS

MODEL 10A

Rack Mounted Chemiluminescent
No-No$_x$ Gas Analyzer
NO-NO$_x$ GAS ANALYZER

INTERPOLL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

Thermo Environmental Instruments Inc.

ACS MODEL 3300 NDIR

RANGE: 0-20% CO_2
SERIAL NO: N4J0877T
CELL LENGTH: 4 mm
DETECTOR: AB4Y0168, CO_2-H, 6.04 V

CALIBRATION DATA

CAL. CYL. SPEC: 24.5%

ELECT. SPAN CHECK SET: .902 V

CAL. CYL. %	FULL SCALE %	CONCENTRATION: P/10^6 %	LINEARIZER VOLTS IN	OUT
80	.98	19.6	1.00	.9
64	.784	15.68	.888	.7
48	.588	11.76	.745	.5
36	.441	8.82	.616	.4
24	.294	5.88	.46	.2
16	.196	3.92	.336	.1
8	.098	1.96	.189	.0
0	0	0	0	0

INTERPOLL
SO #8410

14)	Materials of gas-contacting parts	:	Measuring cell; SUS304 Window ; CaF_2 Piping ; Polyethylene
15)	Sample gas flow rate	:	1ℓ/min ± 0.5ℓ/min
16)	Sample gas temperature	:	0 to 55°C
17)	Purging gas flow rate	:	1ℓ/min (to be flowed as occasion demands)
18)	Warmup time	:	Approx. 2 hours
19)	External dimensions	:	200 x 250 x 541 (H x W x D) mm
20)	Weight	:	Approx. 11 kg
21)	Finish color	:	MUNSELL N1.5

Remarks) For combinations of measuring ranges for the dual-component analyzer, inquiry should be made to the manufacturer.

APPENDIX J

MEASUREMENT SYSTEM PERFORMANCE SPECIFICATIONS

THERMO ENVIRONMENTAL INSTRUMENTS INC.

Model 10A

Chemiluminescent Gas Analyzer

INTERFERENCE RESPONSE TEST

DATE OF TEST JANUARY 18, 1980

ANALYZER TYPE 10A/R Range 0 - 2.5 PPM SERIAL NO. 10 A/R - 014B-80

TEST GAS TYPE	CONCENTRATION PPM	ANALYZER OUTPUT RESPONSE	% OF SPAN
CO	500	< .1 PPM	< .1 %
SO_2	201	< .1 PPM	< .1 %
CO_2	10%	< .1 PPM	< .1 %
O_2	20.9 %	< .1 PPM	< .1 %

INTERPOLL LABORATORIES

Stationary Gas Turbine NO_x Determination

EPA Method 20-Response Time

Job Fayetteville N.C. - PWC
Source Gas Turbine Perf. Test
Date of test 1-12-89

Technician Dr Perry Lannes
CEMS: TECO Model 10 NOx Analyzer
Mode: ☒ NO_x ☐ NO
Fugi Model 3300 NDIR CO_2
Teledyne Model 320 O_2
Moisture removal: Via Model MK-1 Condenser

	Response Time (secs)		
Analyzer type:	NOx	O_2	CO_2
Analyzer S/N:	10AR-24696-216	2	W4J08 77T
Analyzer Range:	0-100 ppm	0-25 %	0-20 %
High level span gas conc. (ppm or %)	90	20.99	10.02
Upscale 1	28.4	27.2	
Upscale 2	28.6	27.1	
Upscale 3	28.4	27.3	
Average:	28.5	27.2	
Downscale 1	28.3	27.0	
Downscale 2	28.7	27.0	
Downscale 3	28.5	27.1	
Average:	28.5	27.0	

System Response Time: 28.5 seconds for NO

1. *Introduce gases at the 3-way valve on the probe. Use zero and stack gas for the upscale tests and high-level span gas and stack gas for the downscale tests. Alternatively, use zero and high-level gases for a more stringent test. Record the time in seconds from the moment of introduction until a stable response is achieved.*
2. *The response time test need only be conducted prior to the initial field use of the measurement system.*
3. *Attach a copy of the flow flow system schematic to this test.*

S-420-3

APPENDIX K

CALIBRATION GAS CERTIFICATION DATA

Interpoll Laboratories, Inc.

METHOD 20

1/14/89

NO Standard Gases

HIGH	86* ppm NO in N_2
MID	48* ppm NO in N_2
LOW	16* ppm NO in N_2

Scott Primary Standards ± 2%

* Analyzed by Method 7A for certification on 11/13/89.

Interpoll Laboratories, Inc.
(612) 786-6020

CERTIFICATE OF ANALYSIS FOR
HIGH RANGE STANDARD GAS FOR METHOD 3A(20)

Vendor: Linde
Cylinder No: Q-10 892 Intp SS#103
Date of Preparation: 12-29-89
Label: 10.02% CO_2 20.99% O_2
Blend Specification: 10% CO_2 21% O_2

Results Of Analyses Of Standard Gas (by Orsat)

Date of Analysis	Run	CO_2 (% v/v)	O_2 (% v/v)
1-13-89	1	10.00	21.00
1-13-89	2	10.00	21.00
1-13-89	3	10.00	21.00
	4		
	5		
	6		
	Avg	10.00	21.00

Analyst: [signature]

- [x] Results are within 5% of the vendor tag value; use tag value.
- [ ] Results are not within 5% of the vendor tag value; conduct another set of triplicate analyses.
- [ ] All results within ± 5% of the average; relabel as above.
- [ ] All results not within ± 5% of the average; perform another set of triplicate analyses.

Approved by,

1-13-89
Date

[signature]
Dr. Perry Lonnes

S-425

LINDE
UNION CARBIDE

Union Carbide Corporation
Linde Division
4550 Kennedy Avenue
East Chicago, IN 46312

DATE : DECEMBER 29, 1988

TO: OXYGEN SERVICE COMPANY
1111 PIERCE BUTLER ROUTE
ST PAUL, MN 55104

LINDE ORDER NUMBER : 362.040.01
CUSTOMER PO NUMBER : 7111
CUSTOMER REL NUMBER :

DEAR SIR/MADAM:

THIS IS YOUR CERTIFICATE OF ANALYSIS FOR:

CYLINDER NUMBER	MIXTURE COMPONENTS	REQUESTED COMPOSITION	CERTIFIED COMPOSITION	CERTIFICATION ACCURACY
Q 10892	CARBON DIOXIDE	10%	10.02%	± 0.02% ABS
	OXYGEN	21%	20.99%	± 0.02% ABS
	NITROGEN	BALANCE	BALANCE	

COA-6MP

APPROVED BY E.J. Biestek

IMPORTANT
The information contained herein has been prepared at your request by qualified experts within the Linde Division of Union Carbide Corporation. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall Union Carbide's liability arising out of the use of the information contained herein exceed the fee established for providing such information.

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Method 20 CALIBRATION GAS CERTIFICATION Source LINDE Reported Value 3.49% CO
Team Leader JBURGSH Test Site 12.99% O
Date Submitted 1-13-89 Date of Test 1-13-89
Test No. No. of Runs Completed
Date of Analysis 1-13-89 Technician JBURGSH

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
1		1	0.00	3.48	16.44	3.48	12.96	
		2	0.00	3.48	16.44	3.48	12.96	
	☐ B ☐ F	Avg				3.48	12.96	
2		1	0.00	3.44	16.40	3.44	12.96	
		2	0.00	3.44	16.40	3.44	12.96	
	☐ B ☐ F	Avg				3.44	12.96	
3		1	0.00	3.48	16.40	3.48	12.92	
		2	0.00	3.48	16.40	3.48	12.92	
	☐ B ☐ F	Avg				3.48	12.92	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

LSC 04 RD

APPENDIX L

FUEL ANALYSES

Entered on SCADA
5pm 1/19/89

TRANSCONTINENTAL GAS PIPE LINE CORPORATION

ACCURACY TEST - GROVER MEASUREMENT LAB

ENCAL II

GROVER CHROMATOGRAPH TAPES

Current M. L. Analysis: BTU 1028.2 SP.GR. .5825

and

Certified Gas Analysis: BTU 1066.4 SP. GR. .6155

Calibration Report (RF - Update)

VENDOR CHROMATOGRAPH

VENDOR: Liquid Carbonic

Certified Gas # PC910 BTU 1066.1 SP.GR. .6131

COPY OF CURRENT M.L. GAS ANALYSIS

DATE: 1/4/89

BTU: 1066.4

SP.GR.: .6155
Gravity @ 60°F, 14.73 PSI, BTU @ 60°F, Dry)

Test Performed By: [signature] Witness [signature]

City of Fayetteville
Sample Log No. 7319-01-5883

Results of the Proximate and Ultimate Analysis

Sample Identification: Distillate Oil, Unit #1, Base Load

Date Analyzed: February 10, 1989

Parameter		As Received
PROXIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Volatile Matter		99.97
Fixed Carbon	(by difference)	0.03
Gross Heating Value	(BTU/LB)	19,274
Net Heating Value	(BTU/LB)	18,109
Sulfur		0.23
ULTIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Carbon		87.03
Hydrogen		12.57
Oxygen	(by difference)	0.12
Nitrogen		0.05
Sulfur		0.23
Specific Gravity	(60/60 °F)	0.8645
Sediment, %		0.01

9287

City of Fayetteville
Sample Log No. 7319-03-5885

Results of the Proximate and Ultimate Analysis

Sample Identification: Distillate Oil, Unit #3, Base Load

Date Analyzed: February 10, 1989

Parameter		As Received
PROXIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Volatile Matter		99.97
Fixed Carbon	(by difference)	0.03
Gross Heating Value	(BTU/LB)	19,378
Net Heating Value	(BTU/LB)	18,211
Sulfur		0.22
ULTIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Carbon		87.02
Hydrogen		12.64
Oxygen	(by difference)	0.04
Nitrogen		0.08
Sulfur		0.22
Specific Gravity	(60/60 °F)	0.8643
Sediment, %		0.02

9251

City of Fayetteville
Sample Log No. 7319-05-5887

Results of the Proximate and Ultimate Analysis

Sample Identification: Distillate Oil, Unit #5, Base Load

Date Analyzed: February 10, 1989

Parameter		As Received
PROXIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Volatile Matter		100.00
Fixed Carbon	(by difference)	0
Gross Heating Value	(BTU/LB)	19,433
Net Heating Value	(BTU/LB)	18,264
Sulfur		0.20
ULTIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Carbon		87.06
Hydrogen		12.66
Oxygen	(by difference)	< 0.01
Nitrogen		0.08
Sulfur		0.20
Specific Gravity	(60/60 ^{0}F)	0.8644
Sediment, %		< 0.01

9232

City of Fayetteville
Sample Log No. 7319-07-5889

Results of the Proximate and Ultimate Analysis

Sample Identification: Distillate Oil, Unit #7, 11 MW

Date Analyzed: February 10, 1989

Parameter		As Received
PROXIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Volatile Matter		99.78
Fixed Carbon	(by difference)	0.22
Gross Heating Value	(BTU/LB)	19,382
Net Heating Value	(BTU/LB)	18,213
Sulfur		0.22
ULTIMATE ANALYSIS, WT%		
Moisture	(Total)	< 0.01
Ash		< 0.01
Carbon		87.05
Hydrogen		12.66
Oxygen	(by difference)	0.02
Nitrogen		0.05
Sulfur		0.22
Specific Gravity	(60/60 °F)	0.8644
Sediment, %		< 0.01

9256

$20000 \frac{\%S}{HI}$

CALCL

Emission Factor by the Oxygen F-Factor Method	M-1
NO_x at 15% O_2 - ISO	M-3
Maximum Allowable NO_x for Turbines > 100 10^6BTU/HR	M-6
Low Heating Value of Natural Gas	M-12

CALCULATION OF EMISSION FACTOR BY THE OXYGEN F-FACTOR METHOD

CALCULATION OF NO_x AT 15% O_2 - ISO

Calculation of the Specific Humidity of Air

The specific humidity (H_{obs}) of air may be calculated from the barometric pressure and the percent by volume of moisture in the air determined from a psychrometric observation using the following two relationships:

$$H_{obs} = 0.622\ P_v/(P_b - P_v)$$

$$P_v = MC\ (P_b)/100$$

where:

P_v = vapor pressure of water in the ambient air at the observation temperature (dry bulb temperature) in IN.HG. P_v is obtained by calculation from the barometric pressure and the observed moisture content of the air.

MC = moisture content of the air in percent by volume obtained from the psychrometric tables using the wet bulb and dry bulb temperatures.

P_b = barometric pressure in IN.HG.

Note: Use Interpoll Labs EPA Method 2 Program "INSTACK" to obtain the moisture content from wet bulb/dry bulb measurements.

NOx Standard of Performance for Stationary Gas Turbines

(CFR Title 40, Part 60, Subpart GG)

According to the above federal regulation, electrical utility stationary gas turbines with a heat input at peak loads greater than 100 10^6BTU/HR shall not discharge exhaust gas with a STD NO_x concentration in excess of:

$$STD = 75 \left(\frac{14.4}{Y}\right) + 10000\ F \qquad \text{Equation 1}$$

where:

STD = allowable NO_x emissions at 15% oxygen on a dry basis in ppm,d

Y = manufacturer's rated heat rate at manufacturer's rated peak load (kilo/watt·hr). The value of Y shall not exceed 14.4.

F = NO_x emission allowance for fuel-bound nitrogen as defined in Subpart GG (based on nitrogen content of fuel burned).

Note: The above equation has been converted from percent by volume to ppm,d (by volume) since NO_x concentrations are always expressed in the latter units.

The manufacturer's rated heat inputs at the manufacturer's rated peak loads and the rated peak loads for each unit are given in the following table together with the calculated value of Y and STD for both distillate and natural gas:

Calculation of "Y" from Manufacturer's Heat Input and Peak Load Data

According to CFR Title 40, Part 60, Subpart GG:

$$Y = \frac{\text{"heat input at peak load"}}{\text{"peak load"}} = \frac{KJ/HR}{watts}$$

However, H is normally measured in 10^6BTU/HR

and since $1.072 \times 10^6 \frac{KJ}{HR} = 1 \frac{10^6 BTU}{HR}$.

"heat input at peak load" $= (1.072 \times 10^6 \frac{KJ}{HR})(H)$

where:

H = heat input in $\frac{10^6 BTU}{HR}$

Load is normally measured in MW (10^6 watts).

If MW = peak load in MW,

then "peak load" = 10^6 watts (MW)

Then,

$$Y = \frac{(1.072 \times 10^6 KJ/HR)(H)}{10^6 \text{watts (MW)}}$$

$$Y = \frac{1.072\ H}{\boxed{MW}} = \frac{KJ}{HR \cdot watt}$$

$$Y_{NG} = \frac{1.072 * 329.5}{29} = 12.18$$

$$Y_{OIL} = \frac{1.072 * 326.6}{29} \quad 12.07$$

Conversion of the Natural Gas High Heating Value from a Volume to a Weight Basis

The natural gas fired had a high heating value of 1028.2 BTU/SCF (@ 60 ^{0}F, 1 atm. and S.G. = 0.5825) based on an analysis performed by the supplier and submitted to the PWC. The actual density of a gas is related to the density of air as follows:

$$\rho_g = SG \ \rho_{air}$$

But at 60 ^{0}F:

$$\rho_{air} = 0.07636 \text{ LB/SCF}$$

[Handbook of Air Pollution Table 13-6]

Using this value, it is seen that the density of the natural gas (ρ_g) is 0.0445 LB/SCF:

$$\rho_g = 0.5825 \times 0.07636 \text{ LB/SCF} = 0.04448 \text{ LB/SCF}$$

The volume-based high heating value of natural gas (h) may be converted to the weight-based high heating value (HHV) using the following expression:

$$HHV = h/\rho_g$$

$$HHV = 1028.2 \frac{BTU}{SCF} \times \frac{SCF}{0.04448 \text{ LB}} = 23116 \frac{BTU}{LB}$$

Relationship of Volume Fractions to Weight Fractions for Gaseous Fuel

$$(f_x)_x = \frac{(f_v)_x \, M_x}{\sum_{i=1}^{n} (f_v)_i \, M_i}$$

where:

$(f_w)_x$ = weight fraction of constituent x in gaseous fuel

$(f_v)_x$ = volume or mole fraction of constituent x in gaseous fuel

M_x = molecular weight of constituent x

i = any one of the n constituent in the fuel mixture

Calculation of the Hydrogen Weight
Fraction in the Gaseous Fuel

Compound	$(f_H)_i$	$(f_v)_i$	M_i	$[(f_v)_i\ M_i]$	$[(f_H)_i\ (f_v)_i M_i]$
Helium	0	0	4	0	0
C_6+	0.1628	0.0006858	86	0.05898	0.009598
N_2	0	0.003622	28	0	0
CH_4	0.25	0.9626	16	15.4015	3.85038
CO_2	0	0.009053	44	0	0
C_2H_6	0.200	0.01901	30	0.5880	0.11760
C_3H_8	0.1818	0.002996	44	0.13182	0.02397
C_4H_{10}	0.1724	0.001410	58	0.08180	0.01410
C_5H_{12}	0.1667	0.0006316	72	0.04548	0.007581
Total				16.308	4.0232

$$H = \frac{\Sigma (f_H)_i\ (f_v)_i\ M_i}{\Sigma\ (f_v)_i\ M_i} = \frac{4.0232}{16.308} = 0.2467$$