TECO
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CORPORATE ENVIRONMENTAL SERVICES
AIR PROGRAMS REPORT

NITROGEN OXIDES - BEST
AVAILABLE CONTROL
TECHNOLOGY DETERMINATION
SOURCE EMISSION TEST #2

POLK POWER GENERATING STATION

AIRS # 1050233

UNIT NO.1 COMBUSTION TURBINE &
HEAT RECOVERY STEAM GENERATOR
FIRED ON SYNGAS

DECEMBER 7, 1999

Prepared by Tampa Electric Company
Corporate Environmental Services
December 20, 1999

RECEIVED
JAN 10 2000
BUREAU OF AIR REGULATION

TAMPA ELECTRIC

January 6, 2000

Mr. Clair Fancy
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Via Fed Ex
Airbill No. 7925 3372 3040

Re: Tampa Electric Company (TEC) – Polk Power Station Title V
Permit BACT Determination for Syngas Combustion Turbine – Test #2

Dear Mr. Fancy:

As per Specific Condition A.49 of the Polk Power Station Title V Permit, Tampa Electric has completed the second NO_x BACT Determination Test on the combustion turbine while operating on syngas. Accordingly, the final report is attached for your review. If you have any questions, please feel free to contact me at (813) 641-5033.

Sincerely,

Gregory M. Nelson, P.E.
Manager
Environmental Planning

EP\gm\SKT133

Enclosure

c/enc: Mr. Al Linero - FDEP
Mr. Syed Arif - FDEP
Mr. Jerry Kissel - FDEP SW
Mr. Rick Kirby - EPCHC

TAMPA ELECTRIC COMPANY
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AN EQUAL OPPORTUNITY COMPANY
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(813) 228-4111

CUSTOMER SERVICE:
HILLSBOROUGH COUNTY (813) 223-0800
OUTSIDE HILLSBOROUGH COUNTY 1 (888) 223-0800

REPORT CERTIFICATION

I have calculated and reviewed all data in this report, and hereby certify that the test report is authentic and accurate to the best of my knowledge.

Date 01/06/00 Signature _____

QA/QC Coordinator
Senior Environmental Technician
Air Services and Auditing
Corporate Environmental Services
Tampa Electric Company

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

Date 12/20/99 Signature _____

Test Team Leader
Senior Environmental Technician
Air Services and Auditing
Corporate Environmental Services
Tampa Electric Company

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

Date 1/6/00 Signature _____

Air Administrator
Air Programs
Tampa Electric Company

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APPENDICES

1.0 SUMMARY OF RESULTS

On December 7, 1999, Corporate Environmental Services, Air Services and Auditing group of Tarnpa Electric Company performed source emission tests on IGCC Unit No. 1 at the Polk Power Electrical Generating Station. The combustion turbine was fired with syngas from a coal gasification system. This test was conducted to satisfy requirements in Title V permit no. 1050233-001-AV for Best Available Control Technology (BACT) NOx determinations. Testing was performed according to USEPA test methods stipulated in 40 CFR Part 60, Appendix A.

The Nitrogen Oxides (NO_x) emission rate was derived from three test runs. The calculated average was 15 ppm corrected to 15% oxygen on a dry basis.

During the tests on December 7, 1999, Unit No. 1 Combustion Turbine was operated at an average load of 190 megawatts. Details of turbine operation are included in Appendix C.

2.0 SOURCE DESCRIPTION/TEST PROCEDURES

Polk Power Electrical Generating Station is located at County Road 630 approximately 13 miles southwest of Bartow, Polk County, Florida. Unit No. 1 is a IGCC generating unit, 192 MW capacity when fired with Syngas fuel. The source sampling location consists of a circular stack 19 ft. in diameter with four sample ports located 90° apart on the stack circumference. A diagram of the stack sampling location is included in Figure 1 and 2 along with other pertinent information on the test site.

Nitrogen Oxides sampling was performed in accordance with USEPA Reference Method 20 (40 CFR Part 60, Appendix A) "Determination of Nitrogen Oxides, Sulfur Dioxide, and Diluent Emissions from Stationary Gas Turbines". Testing was performed using a Thermo Environmental Model 10 A/R Chemiluminescent NO-NO_x Gas Analyzer. Details of fuel bound nitrogen is found in Appendix B.

Diluent sampling was performed in accordance with USEPA Reference Method 3-A (40 CFR Part 60, Appendix A), "Determination of Oxygen and Carbon Dioxide concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)". Testing was performed using a Servomex 1400 B Oxygen Analyzer.

TCEMS Description

The following discussion briefly outlines the operation principles of Corporate Environmental Services Transportable Continuous Emissions Monitoring System (TCEMS). Additional information on instrument operation may be found in the individual instrument manuals provided by the manufacturers. A schematic of the TCEMS set-up is presented in Figure 3.

Servomex Model 1400 B O_2 Analyzer

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

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

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

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

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

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

Data Acquisition System

The data acquisition system (DAS) developed by Entropy Environmentalists Inc., uses a portable personal computer with an internal 32 bit analog-to-digital converter with an external 16 channel multiplexer. In addition to providing an instantaneous display of analyzer responses, the DAS can average data, calculate emission rates, and document analyzer calibrations. The test results and calibrations are stored on the hard disk and printed on a dot matrix printer.

TCEMS Sample Handling System

The extractive monitors utilized in the TCEMS require that the effluent stream be conditioned to eliminate any possible interference (i.e., water vapor and particulate matter), before being transported and injected into each analyzer. Figure 3 depicts a schematic of the entire sample handling system. The major components of this system are listed below:

- Gas transport tubing
- Moisture removal system
- Sampling pump

Gas Transport Tubing

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

Moisture Removal System

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

Sampling Pump

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

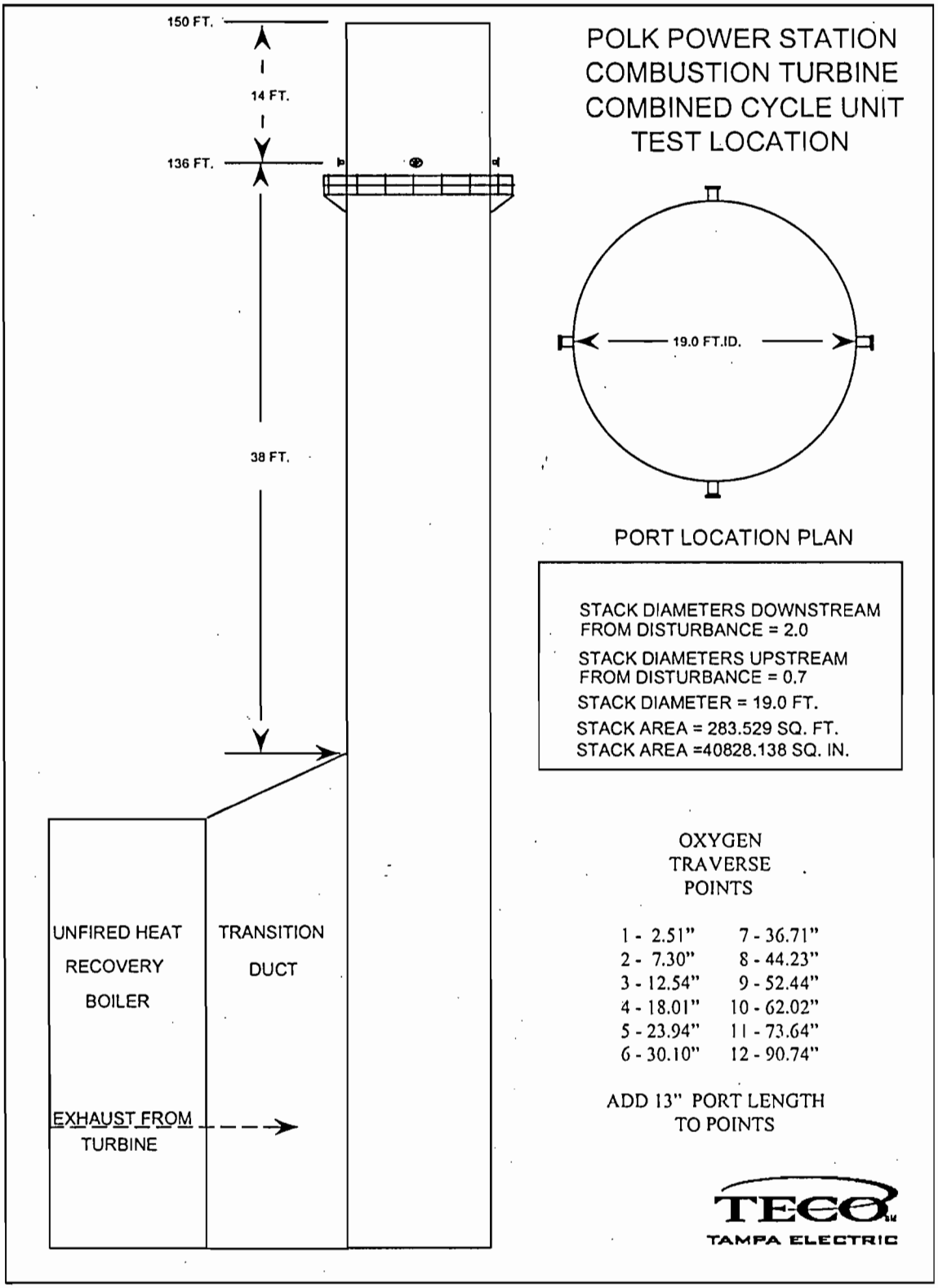
150 FT.
14 FT.
136 FT.
38 FT.
UNFIRED HEAT RECOVERY BOILER
TRANSITION DUCT
EXHAUST FROM TURBINE
POLK POWER STATION
COMBUSTION TURBINE
COMBINED CYCLE UNIT
TEST LOCATION
19.0 FT.ID.
PORT LOCATION PLAN
STACK DIAMETERS DOWNSTREAM FROM DISTURBANCE = 2.0
STACK DIAMETERS UPSTREAM FROM DISTURBANCE = 0.7
STACK DIAMETER = 19.0 FT.
STACK AREA = 283.529 SQ. FT.
STACK AREA =40828.138 SQ. IN.
OXYGEN TRAVERSE POINTS
1 - 2.51" 7 - 36.71"
2 - 7.30" 8 - 44.23"
3 - 12.54" 9 - 52.44"
4 - 18.01" 10 - 62.02"
5 - 23.94" 11 - 73.64"
6 - 30.10" 12 - 90.74"
ADD 13" PORT LENGTH TO POINTS
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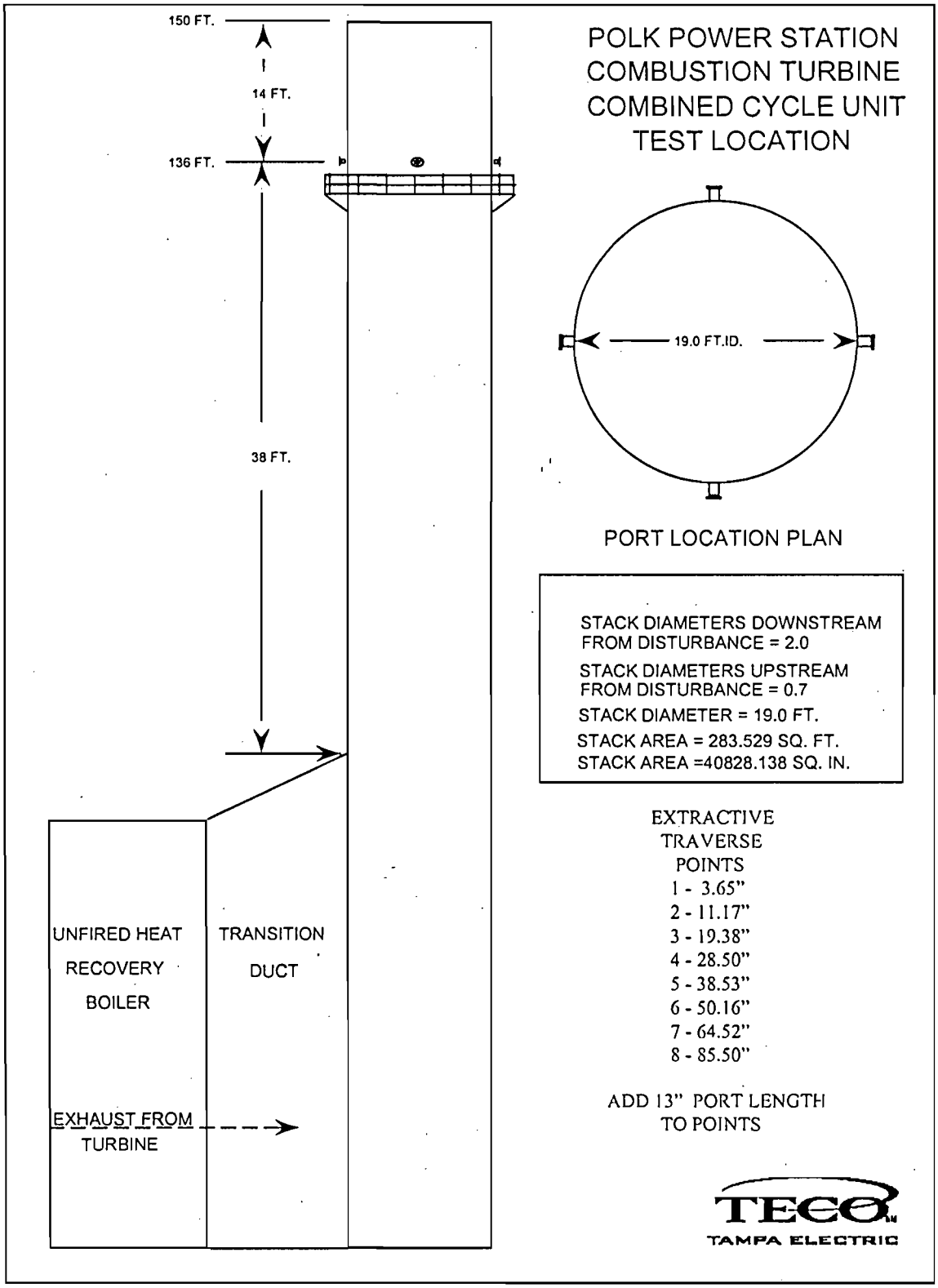
FIGURE 1


150 FT.
14 FT.
136 FT.
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UNFIRED HEAT RECOVERY BOILER
TRANSITION DUCT
EXHAUST FROM TURBINE
POLK POWER STATION
COMBUSTION TURBINE
COMBINED CYCLE UNIT
TEST LOCATION
19.0 FT.ID.
PORT LOCATION PLAN
STACK DIAMETERS DOWNSTREAM FROM DISTURBANCE = 2.0
STACK DIAMETERS UPSTREAM FROM DISTURBANCE = 0.7
STACK DIAMETER = 19.0 FT.
STACK AREA = 283.529 SQ. FT.
STACK AREA =40828.138 SQ. IN.
EXTRACTIVE TRAVERSE POINTS
1 - 3.65"
2 - 11.17"
3 - 19.38"
4 - 28.50"
5 - 38.53"
6 - 50.16"
7 - 64.52"
8 - 85.50"
ADD 13" PORT LENGTH TO POINTS
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FIGURE 2

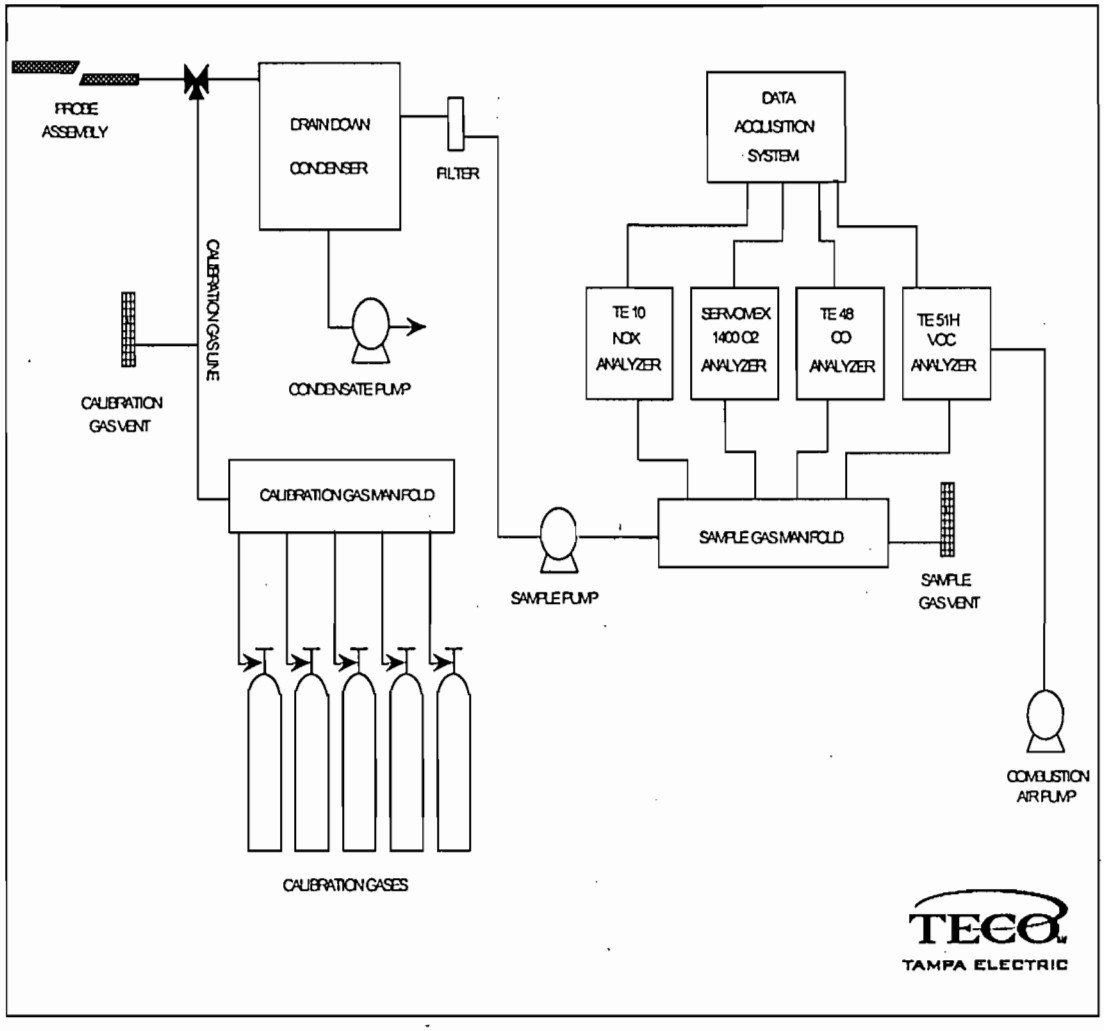

FIGURE 3
Extractive Method Sampling Trains
USEPA METHODS 3A, 10, 20, 25A

3.0 TEST RESULTS

POLK POWER ELECTRICAL GENERATING STATION
NITROGEN OXIDES BACT TESTING

IGCC COMBUSTION TURBINE UNIT 1
DECEMBER 7, 1999

RUN NO.	TIME	O2%	ppm NOx Dry	CORRECTED 15% O2
1	1121 – 1221	11.6	23.0	14.6
2	1242 – 1342	11.5	24.0	15.1
3	1357 – 1457	11.6	22.0	14.0
	Average	11.6	23.0	14.6

Corrected NOx calculated as:

Concentration (ppm NOx) x (Cd / (20.9 - $\%O_2$))

Where:

Cd = NOx coefficient of 5.9

APPENDIX A

SOURCE TEST CALCULATIONS

APPENDIX A - 1 NITROGEN OXIDE CALCULATIONS

APPENDIX A - 2 OXYGEN CALCULATIONS

APPENDIX A - 1

NITROGEN OXIDE CALCULATIONS

CALCULATION OF AVERAGE NITROGEN OXIDES EMISSIONS

RUN: 1

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.6	1.6	1.1
24.0 ppm NOx	24.1	25.1	24.6
0.00 % Oxygen	0.00	0.01	0.01
11.96 % Oxygen	12.14	12.18	12.16

$\bar{C}$(NOx) = 24.0 $\bar{C}$(O2) = 11.75

CORRECTED RESULTS

23 ppm NOx
11.6 % Oxygen
14.6 ppm NOx @15% O2

Corr. Conc. = $\bar{C}$ma(C - Co)/(Cm - Co) (for NOx)

Corr. Conc. = [(Cma - Coa)/(Cm - Co)](C - $\bar{C}$m) + Cma (for O2)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Coa = actual low-level calibration gas concentration
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

E = (ppm NOx)(5.9)/(20.9 - % Oxygen)

8094
1.194E-07

CALCULATION OF AVERAGE NITROGEN OXIDES EMISSIONS

RUN: 2

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.6	2.1	1.9
24.0 ppm NOx	25.1	26.2	25.7
0.00 % Oxygen	0.01	-0.04	-0.02
11.96 % Oxygen	12.18	12.08	12.13
$\bar{C}$(NOx) =	26.1	$\bar{C}$(O2) =	11.63

CORRECTED RESULTS

24 ppm NOx
11.5 % Oxygen
15.1 ppm NOx @15% O2

Corr. Conc. = $\bar{C}ma$(C - Co)/(Cm - Co) (for NOx)

Corr. Conc. = [(Cma - Coa)/(Cm - Co)](C - $\bar{C}m$) + Cma (for O2)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Coa = actual low-level calibration gas concentration
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

E = (ppm NOx)(5.9)/(20.9 - % Oxygen)

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1.194E-07

CALCULATION OF AVERAGE NITROGEN OXIDES EMISSIONS

RUN: 3

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.1	1.6	1.9
24.0 ppm NOx	26.2	23.7	25.0
0.00 % Oxygen	-0.04	0.52	0.24
11.96 % Oxygen	12.08	12.31	12.20
$\bar{C}$(NOx) =	23.5	$\bar{C}$(O2) =	11.83

CORRECTED RESULTS

22 ppm NOx
11.6 % Oxygen
14.0 ppm NOx @15% O2

Corr. Conc. = $\bar{Cma}$(C - Co)/(Cm - Co) (for NOx)

Corr. Conc. = [(Cma - Coa)/(Cm - Co)](C - $\bar{Cm}$) + Cma (for O2)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Coa = actual low-level calibration gas concentration
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

E = (ppm NOx)(5.9)/(20.9 - % Oxygen)

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1.194E-07

APPENDIX A - 2

OXYGEN CALCULATIONS

CALCULATION OF AVERAGE OXYGEN CONCENTRATION

RUN: 1

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.00 % Oxygen	0.00	0.01	0.01
11.96 % Oxygen	12.14	12.18	12.16

$\bar{C}$ = 11.75

CORRECTED RESULTS

11.6 % Oxygen

Corrected Conc. = Cma(C - $\bar{Co}$)/(Cm - Co)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

CALCULATION OF AVERAGE OXYGEN CONCENTRATION

RUN: 2

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.00 % Oxygen	0.01	-0.04	-0.02
11.96 % Oxygen	12.18	12.08	12.13

$\bar{C}$ = 11.63

CORRECTED RESULTS

11.5 % Oxygen

Corrected Conc. = Cma(C - $\bar{C}$o)/(Cm - Co)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

CALCULATION OF AVERAGE OXYGEN CONCENTRATION

RUN: 3

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.00 % Oxygen	-0.04	0.52	0.24
11.96 % Oxygen	12.08	12.31	12.20

$\bar{C}$ = 11.83

CORRECTED RESULTS

11.6 % Oxygen

Corrected Conc. = Cma(C - $\bar{Co}$)/(Cm - Co)

Where: $\bar{C}$ = mean reference measurement
Co = mean zero calibration response
Cm = mean mid or upscale calibration gas response
Cma = actual mid or upscale calibration gas concentration

APPENDIX B

TURBINE DATA

All values are averages for time period given

		TEST PERIOD 1	
		START TIME	12/07/1999 11:00
		END TIME	12/07/1999 15:00
1TSYFI910	GT SYNGAS MASS FLOW	LB/SEC	103.7831726
1PWRJI900	GT GEN LOAD WATTS	MW	189.9994202
1GMLJI962	GT GENERATOR WATTS	MW	190.7236481
1TSYJYI910	GT SYNGAS LOWER HEATING VA	BTU/LB	240.1053314
1NITFI920A	GT N2 FLOW	LB/SEC	124.0823059
1TMSTI922M	GT CPRSR MAX INL FLANGE TE	F	68.92858124
1TMSPI909	AMBIENT BAR PRESS	IN HGA	29.96476555

1 MINUTE AVERAGES

TEST PERIOD 1
12/07/1999 11:00
12/07/1999 15:00

	1TSYFI910	1PWRJI900	1GMLJI962	1TSYJYI910	1NITFI920A	1TMSTI922M	1TMSPI909
07-Dec-99 11:00:00	103.9625626	190.4404144	191.2425385	239.607605	124.497612	63.1239357	29.96849632
07-Dec-99 11:01:00	103.9345474	190.9855499	191.8656464	239.6077728	124.4935379	63.35398483	29.96854973
07-Dec-99 11:02:00	103.5196991	189.9077454	190.7482452	239.6079407	124.4894562	63.58403015	29.96851921
07-Dec-99 11:03:00	103.696907	189.5925598	190.4751892	239.6081085	124.4853745	63.51675797	29.96848679
07-Dec-99 11:04:00	103.0686035	189.6157532	190.2021332	239.6082764	124.4812927	63.20622635	29.96845436
07-Dec-99 11:05:00	103.5120697	189.2690277	189.9290771	239.6084442	124.477211	63.32310104	29.96842384
07-Dec-99 11:06:00	103.0882874	189.3417511	189.6843262	239.6086121	124.4731369	63.2204361	29.96839142
07-Dec-99 11:07:00	103.879509	189.9389648	191.0482025	239.6087799	124.4690552	63.11777496	29.96835899
07-Dec-99 11:08:00	103.5284042	189.9389648	190.631424	239.608963	124.4649734	63.47038651	29.96832848
07-Dec-99 11:09:00	103.8192215	190.355011	190.8731384	239.6091309	124.4608917	63.87020493	29.96829605
07-Dec-99 11:10:00	103.587616	190.7272491	191.1094055	239.6092987	124.45681	64.12386322	29.96826363
07-Dec-99 11:11:00	103.7160797	190.6726379	191.0248108	239.6094666	124.4527359	63.95960617	29.96823311
07-Dec-99 11:12:00	103.7110443	190.3027802	190.9426422	239.6096344	124.4486542	63.44930649	29.96820068
07-Dec-99 11:13:00	103.6808243	190.6772614	191.0035706	239.6098022	124.4445724	63.65351486	29.96816826
07-Dec-99 11:14:00	103.5830002	190.0931091	191.0814819	239.6099701	124.4404907	63.85772705	29.96813583
07-Dec-99 11:15:00	104.0682068	190.1561432	191.6409454	239.6101532	124.436409	64.00067139	29.96810532
07-Dec-99 11:16:00	103.7040634	190.5908508	191.5196991	239.610321	124.4323349	64.14208221	29.96807289
07-Dec-99 11:17:00	103.2264252	189.5184021	189.9727783	239.6104889	124.4282532	63.68755341	29.96804047
07-Dec-99 11:18:00	103.6987076	189.6129608	189.8660278	239.6106567	124.4241714	63.68755341	29.96800995
07-Dec-99 11:19:00	103.3871536	190.5359039	190.591156	239.6108246	124.4200897	63.81074905	29.96797752
07-Dec-99 11:20:00	103.6585312	190.3003082	191.2840424	239.6109924	124.416008	64.20085907	29.9679451
07-Dec-99 11:21:00	103.2150192	189.0609283	190.1057129	239.6111603	124.4119339	63.71300888	29.96791458
07-Dec-99 11:22:00	103.4516296	189.3040771	190.6896667	239.6113434	124.4078522	63.86574936	29.96788216
07-Dec-99 11:23:00	103.2679214	189.5185699	190.1107025	239.6115112	124.4037704	64.07253265	29.96784973
07-Dec-99 11:24:00	103.5946274	189.7260132	190.5500488	239.6116791	124.3996887	64.59661102	29.96781921
07-Dec-99 11:25:00	103.2368393	189.441864	190.2781372	239.6118469	124.395607	64.35485077	29.96778679
07-Dec-99 11:26:00	103.8810501	189.891861	191.0460815	239.6120148	124.3915329	64.93489838	29.96775436

07-Dec-99 11:27:00	103.5700531	189.2627869	190.1210022	239.6121826	124.3874512	64.83223724	29.96772385
07-Dec-99 11:28:00	103.8134384	190.062561	190.8622589	239.6123505	124.3833694	64.72957611	29.96769142
07-Dec-99 11:29:00	103.4263153	189.6136322	190.473114	239.6125336	124.3792877	64.62691498	29.967659
07-Dec-99 11:30:00	103.5166473	190.2319336	191.3416443	239.6127014	124.375206	65.08889008	29.96762848
07-Dec-99 11:31:00	104.0836792	190.4150543	190.7140045	239.6128693	124.3711319	65.5508728	29.96759605
07-Dec-99 11:32:00	103.9076691	190.3487091	191.5337982	239.6130371	124.3670502	65.11968994	29.96756363
07-Dec-99 11:33:00	103.6020966	189.7439423	190.80867	239.613205	124.3629684	64.65771484	29.96753311
07-Dec-99 11:34:00	102.9939041	189.9238434	190.1040955	239.6133728	124.3588867	64.94003296	29.96750069
07-Dec-99 11:35:00	103.3480682	189.7720032	190.6116791	239.6135406	124.354805	64.94003296	29.96746826
07-Dec-99 11:36:00	103.633461	190.3112946	191.1032867	239.6137085	124.3507233	64.94003296	29.96743774
07-Dec-99 11:37:00	103.6207123	189.4214478	190.6523743	239.6138916	124.3466492	65.71812439	29.96740532
07-Dec-99 11:38:00	103.5144653	188.9599304	190.2085724	239.6140594	124.3425674	65.87068939	29.96737289
07-Dec-99 11:39:00	103.7095642	189.7807617	189.9929199	239.6142273	124.3384857	65.87068939	29.96734238
07-Dec-99 11:40:00	103.8358688	190.1358795	191.0632782	239.6143951	124.334404	66.28334045	29.96730995
07-Dec-99 11:41:00	103.7120361	189.9563751	191.111618	239.614563	124.3303223	66.25687408	29.96727753
07-Dec-99 11:42:00	103.7698975	190.1911163	191.152298	239.6147308	124.3262482	66.04240417	29.96724701
07-Dec-99 11:43:00	103.8643951	190.4675751	190.7603302	239.6148987	124.3221664	66.09323883	29.96721458
07-Dec-99 11:44:00	103.9168167	189.917099	191.4618988	239.6150818	124.3180847	66.40377045	29.96718216
07-Dec-99 11:45:00	103.8971024	189.5791931	190.7730255	239.6152496	124.314003	66.25188446	29.96715164
07-Dec-99 11:46:00	103.2413254	189.6032104	190.1097412	239.6174622	124.3099213	66.35398865	29.96711922
07-Dec-99 11:47:00	103.5274048	189.6272125	190.9396057	239.6298828	124.3058472	66.45609283	29.96708679
07-Dec-99 11:48:00	103.8950806	190.0965576	190.8187408	239.6423187	124.3017654	66.86651611	29.96705627
07-Dec-99 11:49:00	103.9826584	190.3667297	190.7148132	239.6547546	124.2976837	67.03184509	29.96702385
07-Dec-99 11:50:00	104.228508	190.5526886	191.5801239	239.6671753	124.293602	66.87528229	29.96699142
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07-Dec-99 14:15:00	104.6305695	190.6480713	192.005127	239.7503967	123.8953629	72.4401474	29.96238136
07-Dec-99 14:16:00	104.4169388	191.2190857	191.1617737	239.7478638	123.8971634	72.37270355	29.96234894
07-Dec-99 14:17:00	104.4810333	191.019165	191.3188782	239.7453308	123.8989639	72.18876648	29.96231842
07-Dec-99 14:18:00	104.3528595	190.3159943	191.4669342	239.7427979	123.9007645	71.61296082	29.962286
07-Dec-99 14:19:00	104.2429886	190.3140411	191.0802002	239.7402802	123.902565	71.62134552	29.96225357
07-Dec-99 14:20:00	104.2268295	190.4744415	190.7049408	239.7377472	123.9043655	71.62068176	29.96222305
07-Dec-99 14:21:00	104.0461426	190.1394958	191.0070801	239.7352142	123.9061661	71.82488251	29.96219063
07-Dec-99 14:22:00	104.5472641	190.1340027	191.2971344	239.7326813	123.9079666	72.02909088	29.9621582
07-Dec-99 14:23:00	104.1106186	190.4807129	190.8741455	239.7301483	123.9097672	71.87799835	29.96212769
07-Dec-99 14:24:00	104.2182083	190.1810608	190.4380646	239.7276306	123.9115677	71.41602325	29.96209526
07-Dec-99 14:25:00	103.9723663	189.3032227	189.2706146	239.7250977	123.9133682	71.18503571	29.96206284
07-Dec-99 14:26:00	104.2089081	189.7799072	190.506546	239.7225647	123.9151688	71.18503571	29.96203041
07-Dec-99 14:27:00	103.993042	189.9316406	190.5198364	239.7200317	123.9169769	70.8719101	29.96199989
07-Dec-99 14:28:00	103.9745789	190.3836823	191.2957306	239.7174988	123.9187775	70.8719101	29.96196747
07-Dec-99 14:29:00	104.0255814	190.8264618	190.8026428	239.7149811	123.920578	70.8719101	29.96193504
07-Dec-99 14:30:00	103.8837891	190.2232513	191.1442413	239.7124481	123.9223785	70.8719101	29.96190453
07-Dec-99 14:31:00	103.6652756	189.7129211	190.2818909	239.7099152	123.9241791	71.43912506	29.9618721

07-Dec-99 14:32:00	103.5601654	190.1628113	191.304184	239.7073822	123.9259796	71.28513336	29.96183968
07-Dec-99 14:33:00	104.0836868	189.9512024	190.7966003	239.7048492	123.9277802	70.92324066	29.96180916
07-Dec-99 14:34:00	104.0897903	189.9097137	191.04776	239.7023315	123.9295807	71.07723999	29.96177673
07-Dec-99 14:35:00	104.0991669	190.3786621	191.2989197	239.6997986	123.9313812	71.37290955	29.96174431
07-Dec-99 14:36:00	104.1556549	190.7538147	191.5372925	239.6972656	123.9331818	71.67267609	29.96171379
07-Dec-99 14:37:00	104.5565109	190.5691986	191.0219269	239.6947327	123.9349823	72.10402679	29.96168137
07-Dec-99 14:38:00	103.8646545	189.7006073	190.506546	239.6921997	123.9367828	72.02765656	29.96164894
07-Dec-99 14:39:00	104.2954941	189.9911957	190.5548859	239.689682	123.9385834	71.95128632	29.96161842
07-Dec-99 14:40:00	104.066185	189.9277649	190.6032257	239.687149	123.9403839	71.87491608	29.961586
07-Dec-99 14:41:00	104.1056595	189.6326752	190.6515656	239.6846161	123.9421844	71.86260223	29.96155357
07-Dec-99 14:42:00	104.5601959	189.4803009	190.6999054	239.6820831	123.943985	72.07819366	29.96152306
07-Dec-99 14:43:00	104.7534103	190.8419189	191.5458832	239.6795502	123.9457855	71.85233307	29.96149063
07-Dec-99 14:44:00	104.566864	191.0958557	191.6351776	239.6770325	123.9475861	72.46160889	29.96145821
07-Dec-99 14:45:00	104.4792633	190.1142578	191.1917114	239.6744995	123.9493866	72.15504456	29.96142769
07-Dec-99 14:46:00	104.1514359	190.1946564	190.7482452	239.6719666	123.9511871	72.48337555	29.96139526
07-Dec-99 14:47:00	104.430603	190.2750397	190.9899597	239.6694336	123.9529877	72.25809479	29.96136284
07-Dec-99 14:48:00	103.3961029	189.6422272	190.5024872	239.6669006	123.9547882	72.0328064	29.96133232
07-Dec-99 14:49:00	104.1090469	189.9712982	190.0469055	239.6643677	123.9565964	71.81127167	29.9612999
07-Dec-99 14:50:00	104.2626266	190.8450623	191.4733734	239.66185	123.9583969	71.81127167	29.96126747
07-Dec-99 14:51:00	104.16436	191.1071167	191.0468292	239.659317	123.9601974	72.12438965	29.96123695
07-Dec-99 14:52:00	104.2956314	190.1984711	190.6302185	239.6567841	123.961998	72.77772522	29.96120453
07-Dec-99 14:53:00	104.1668167	189.8316498	190.7831268	239.6542511	123.9637985	72.81151581	29.9611721
07-Dec-99 14:54:00	103.818306	188.7185211	189.9747925	239.6517181	123.9655991	72.41409302	29.96114159
07-Dec-99 14:55:00	104.0549164	189.28862	190.5475769	239.6492004	123.9673996	72.32212067	29.96110916
07-Dec-99 14:56:00	104.1560059	189.6245728	191.0993347	239.6466675	123.9692001	72.23015594	29.96107674
07-Dec-99 14:57:00	104.3310242	189.7189178	190.4104614	239.6441345	123.9710007	72.13818359	29.96104622
07-Dec-99 14:58:00	103.3095398	189.2283783	189.7398682	239.6416016	123.9728012	72.09179688	29.96101379
07-Dec-99 14:59:00	104.1926346	189.5104828	190.1473846	239.6390686	123.9746017	71.60387421	29.96098137
07-Dec-99 15:00:00	104.1377029	189.509903	190.5548859	239.6365509	123.9764023	71.55871582	29.96095085

KCW 1 CEMS

Record#	DATE	TIME	PC1CO211	PC1NOX12	PC1GEN13	PC1NOX14	PC1PRS15	PC1TMP16	PC1SYN17
1	12/07/1999	112100	8.155	23.654	189.665	0.080	30.004	300.584	66.714
2	12/07/1999	112200	8.150	23.651	189.895	0.080	30.003	300.590	66.714
3	12/07/1999	112300	8.171	23.766	189.817	0.080	30.001	299.872	66.714
4	12/07/1999	112400	8.178	24.031	189.675	0.081	30.002	299.448	66.714
5	12/07/1999	112500	8.188	23.982	189.997	0.081	30.002	295.662	66.714
6	12/07/1999	112600	8.151	23.962	189.588	0.081	30.002	295.667	66.714
7	12/07/1999	112700	8.110	23.617	189.007	0.080	30.005	300.481	66.714
8	12/07/1999	112800	8.117	23.599	189.413	0.080	30.003	300.532	66.714
9	12/07/1999	112900	8.148	23.833	189.775	0.081	30.001	296.919	66.714
10	12/07/1999	113000	8.145	23.968	189.161	0.081	30.000	294.681	66.714
11	12/07/1999	113100	8.126	23.991	188.534	0.081	30.001	296.476	66.714
12	12/07/1999	113200	8.123	23.905	188.754	0.081	30.003	298.133	66.714
13	12/07/1999	113300	8.138	24.023	188.973	0.081	30.002	297.908	66.714
14	12/07/1999	113400	8.127	23.949	189.023	0.081	30.001	297.628	66.714
15	12/07/1999	113500	8.120	24.123	189.063	0.082	29.999	299.333	66.714
16	12/07/1999	113600	8.146	24.178	189.110	0.082	30.001	302.758	66.714
17	12/07/1999	113700	8.132	24.183	188.843	0.082	30.002	302.199	66.714
18	12/07/1999	113800	8.141	23.967	189.179	0.081	30.000	297.077	66.714
19	12/07/1999	113900	8.140	24.241	189.583	0.082	30.000	297.022	66.714
20	12/07/1999	114000	8.171	24.212	189.735	0.082	30.000	294.936	66.714
21	12/07/1999	114100	8.176	23.879	189.609	0.081	29.998	294.920	66.714
22	12/07/1999	114200	8.163	23.872	189.659	0.081	29.996	297.914	66.714
23	12/07/1999	114300	8.119	23.694	189.319	0.080	29.997	297.974	66.714
24	12/07/1999	114400	8.092	23.770	189.283	0.081	29.998	296.324	66.714
25	12/07/1999	114500	8.101	23.697	189.193	0.081	29.997	295.524	66.714
26	12/07/1999	114600	8.137	24.032	189.366	0.081	30.000	297.499	66.714
27	12/07/1999	114700	8.136	23.858	188.464	0.081	30.000	298.516	66.714
28	12/07/1999	114800	8.147	23.998	188.826	0.081	30.001	299.768	66.714
29	12/07/1999	114900	8.135	24.124	189.951	0.082	29.999	301.657	66.714
30	12/07/1999	115000	8.159	24.113	189.751	0.082	30.002	301.648	66.714
31	12/07/1999	115100	8.177	24.058	189.548	0.081	29.999	301.259	66.714
32	12/07/1999	115200	8.134	23.901	189.569	0.081	29.999	301.240	66.714
33	12/07/1999	115300	8.126	23.788	189.991	0.081	29.999	300.315	66.714
34	12/07/1999	115400	8.144	23.985	188.904	0.081	29.998	299.958	66.714
35	12/07/1999	115500	8.125	23.682	188.880	0.080	29.997	300.635	66.714
36	12/07/1999	115600	8.125	23.776	189.100	0.081	29.994	301.040	66.714
37	12/07/1999	115700	8.115	24.037	189.296	0.082	29.994	300.743	66.714
38	12/07/1999	115800	8.140	24.222	189.726	0.082	29.991	300.322	66.714
39	12/07/1999	115900	8.136	24.296	189.768	0.082	29.988	299.836	66.714
40	12/07/1999	120000	8.114	24.342	189.768	0.083	29.989	297.241	66.714
41	12/07/1999	120100	8.123	24.401	189.588	0.083	29.989	297.466	66.714
42	12/07/1999	120200	8.139	24.519	189.911	0.083	29.987	299.720	66.714
43	12/07/1999	120300	8.130	24.594	189.644	0.083	30.182	299.722	66.714
44	12/07/1999	120400	6.079	19.059	190.070	0.086	29.991	296.687	66.714
45	12/07/1999	120500	7.382	21.971	189.547	0.082	29.990	296.652	66.714
46	12/07/1999	120600	7.882	23.452	189.185	0.082	29.991	298.107	66.714
47	12/07/1999	120700	7.939	23.675	189.447	0.082	29.989	298.637	66.714
48	12/07/1999	120800	7.980	24.012	189.874	0.083	29.988	300.203	66.714
49	12/07/1999	120900	7.981	24.135	189.991	0.083	29.988	300.931	66.714
50	12/07/1999	121000	8.007	24.044	190.258	0.083	29.989	299.492	66.714
51	12/07/1999	121100	8.054	23.991	189.459	0.082	29.988	296.390	66.714
52	12/07/1999	121200	8.087	23.899	189.113	0.082	29.989	297.068	66.714
53	12/07/1999	121300	8.074	23.913	189.252	0.082	29.987	299.578	66.714
54	12/07/1999	121400	8.063	24.026	189.705	0.082	29.987	299.555	66.714
55	12/07/1999	121500	8.091	24.239	189.856	0.083	29.985	299.343	66.714
56	12/07/1999	121600	8.118	24.487	189.247	0.083	29.984	299.363	66.714
57	12/07/1999	121700	8.125	24.280	188.700	0.082	29.987	300.148	66.714
58	12/07/1999	121800	8.138	24.440	188.672	0.083	29.987	300.253	66.714

59	12/07/1999	121900		8.109	24.278	188.661	0.083	29.984	297.308	66.714
60	12/07/1999	122000		8.139	24.583	188.896	0.083	29.985	296.460	66.714
61	/ /									
62	/ /		AVE	8.070	23.899	189.397	0.082	29.999	298.755	66.714

Run 2 CEMS

Record#	DATE	TIME	PC1CO211	PC1NOX12	PC1GEN13	PC1NOX14	PC1PRS15	PC1TMP16	PC1SYN17
1	12/07/1999	124200	8.156	24.062	189.961	0.081	29.977	301.842	66.714
2	12/07/1999	124300	8.151	24.157	189.754	0.082	29.979	302.401	66.714
3	12/07/1999	124400	8.143	24.037	189.105	0.081	29.979	299.999	66.714
4	12/07/1999	124500	8.150	23.849	188.217	0.081	29.979	299.199	66.714
5	12/07/1999	124600	8.164	24.075	188.010	0.081	29.977	298.680	66.714
6	12/07/1999	124700	8.160	24.036	189.489	0.081	29.975	298.627	66.714
7	12/07/1999	124800	8.155	24.283	188.122	0.082	29.976	299.344	66.714
8	12/07/1999	124900	8.154	23.907	188.814	0.081	29.976	299.854	66.714
9	12/07/1999	125000	8.144	23.990	189.289	0.081	29.974	299.294	66.714
10	12/07/1999	125100	8.137	23.860	189.711	0.081	29.968	298.639	66.714
11	12/07/1999	125200	8.119	24.018	189.582	0.082	29.972	299.080	66.714
12	12/07/1999	125300	8.161	23.728	188.993	0.080	29.973	299.671	66.714
13	12/07/1999	125400	8.173	23.849	189.226	0.080	29.970	299.453	66.714
14	12/07/1999	125500	8.171	23.711	189.836	0.080	29.971	299.096	66.714
15	12/07/1999	125600	8.194	23.870	189.810	0.080	29.971	299.613	66.714
16	12/07/1999	125700	8.198	23.766	188.950	0.080	29.970	300.196	66.714
17	12/07/1999	125800	8.175	23.691	188.688	0.080	29.967	300.482	66.714
18	12/07/1999	125900	8.167	23.597	189.446	0.080	29.969	302.310	66.714
19	12/07/1999	130000	8.169	23.741	189.338	0.080	29.969	302.186	66.714
20	12/07/1999	130100	8.153	23.831	189.113	0.081	29.972	298.937	66.714
21	12/07/1999	130200	8.176	23.981	188.826	0.081	29.971	299.070	66.714
22	12/07/1999	130300	8.172	23.960	188.539	0.081	29.968	298.766	66.714
23	12/07/1999	130400	8.167	24.159	188.844	0.082	29.969	298.734	66.714
24	12/07/1999	130500	8.175	24.170	188.990	0.082	29.967	297.234	66.714
25	12/07/1999	130600	8.180	23.959	189.399	0.081	29.967	296.766	66.714
26	12/07/1999	130700	8.150	23.919	189.342	0.081	29.966	297.998	66.714
27	12/07/1999	130800	8.155	24.043	189.552	0.081	29.965	299.105	66.714
28	12/07/1999	130900	8.163	23.918	190.055	0.081	29.966	298.411	66.714
29	12/07/1999	131000	8.187	24.114	190.001	0.081	29.966	296.736	66.714
30	12/07/1999	131100	8.180	23.971	190.398	0.081	29.963	296.523	66.714
31	12/07/1999	131200	8.173	23.747	190.378	0.080	29.961	294.570	66.714
32	12/07/1999	131300	8.126	23.793	189.688	0.081	29.959	294.718	66.714
33	12/07/1999	131400	8.173	24.121	189.921	0.081	29.957	299.748	66.714
34	12/07/1999	131500	8.181	24.147	190.256	0.081	29.959	299.824	66.714
35	12/07/1999	131600	8.169	24.165	189.818	0.082	29.959	296.242	66.714
36	12/07/1999	131700	8.119	23.979	189.165	0.081	29.960	295.932	66.714
37	12/07/1999	131800	8.142	23.899	188.446	0.081	29.958	298.345	66.714
38	12/07/1999	131900	8.151	23.865	188.454	0.081	29.958	298.845	66.714
39	12/07/1999	132000	8.152	23.721	188.567	0.080	29.957	299.064	66.714
40	12/07/1999	132100	8.150	23.726	189.001	0.080	29.958	299.198	66.714
41	12/07/1999	132200	8.173	24.012	189.317	0.081	29.958	298.875	66.714
42	12/07/1999	132300	8.166	23.919	189.218	0.081	29.957	298.489	66.714
43	12/07/1999	132400	8.170	24.214	188.927	0.082	29.957	299.174	66.714
44	12/07/1999	132500	8.175	24.218	189.313	0.082	29.955	301.552	66.714
45	12/07/1999	132600	8.193	24.516	190.225	0.083	29.954	301.415	66.714
46	12/07/1999	132700	8.165	24.424	190.157	0.083	29.951	299.498	66.714
47	12/07/1999	132800	8.159	24.474	189.602	0.083	29.952	299.538	66.714
48	12/07/1999	132900	8.151	24.305	188.247	0.082	29.951	300.883	66.714
49	12/07/1999	133000	8.159	24.007	188.532	0.081	29.950	300.877	66.714
50	12/07/1999	133100	8.164	24.299	189.601	0.082	29.952	299.750	66.714
51	12/07/1999	133200	8.184	24.565	190.394	0.083	29.951	299.444	66.714
52	12/07/1999	133300	8.185	24.713	188.890	0.083	29.951	299.826	66.714
53	12/07/1999	133400	8.193	24.711	189.124	0.083	29.950	300.061	66.714
54	12/07/1999	133500	8.184	24.391	188.888	0.082	29.951	299.574	66.714
55	12/07/1999	133600	8.192	24.530	189.192	0.083	29.951	298.712	66.714
56	12/07/1999	133700	8.174	24.506	190.158	0.083	29.950	298.706	66.714
57	12/07/1999	133800	8.180	24.412	190.201	0.082	29.950	298.720	66.714
58	12/07/1999	133900	8.186	24.408	188.997	0.082	29.952	298.733	66.714

59	12/07/1999	134000	8.182	24.244	188.494	0.082	29.949	300.054	66.714
60	12/07/1999	134100	8.186	24.360	190.186	0.082	29.950	300.125	66.714
61	/ /								
62	/ /	AVE	8.166	24.077	189.313	0.081	29.963	299.146	66.714

RUN 3 CEMS

Record#	DATE	TIME	PC1CO211	PC1NOX12	PC1GEN13	PC1NOX14	PC1PRS15	PC1TMP16	PC1SYN17
1	12/07/1999	135700	8.164	24.232	190.311	0.082	29.941	299.153	66.714
2	12/07/1999	135800	8.179	24.262	189.239	0.082	29.940	299.014	66.714
3	12/07/1999	135900	8.150	24.108	188.968	0.082	29.941	300.428	66.714
4	12/07/1999	140000	8.158	24.212	189.168	0.082	29.941	300.665	66.714
5	12/07/1999	140100	8.157	24.261	189.056	0.082	29.937	298.353	66.714
6	12/07/1999	140200	8.146	24.194	189.464	0.082	29.939	297.612	66.714
7	12/07/1999	140300	8.163	24.477	189.494	0.083	29.938	299.477	66.714
8	12/07/1999	140400	8.174	24.638	189.906	0.083	29.939	300.327	66.714
9	12/07/1999	140500	8.194	24.510	189.553	0.083	29.940	299.404	66.714
10	12/07/1999	140600	8.181	24.386	189.113	0.082	29.938	297.644	66.714
11	12/07/1999	140700	8.168	24.547	189.054	0.083	29.936	298.940	66.714
12	12/07/1999	140800	8.160	24.374	188.910	0.082	29.934	304.538	66.714
13	12/07/1999	140900	8.151	24.508	189.287	0.083	29.935	304.696	66.714
14	12/07/1999	141000	8.145	24.378	190.386	0.083	29.936	303.046	66.714
15	12/07/1999	141100	8.152	24.398	190.065	0.083	29.936	303.016	66.714
16	12/07/1999	141200	8.158	23.516	189.380	0.080	29.939	299.786	66.714
17	12/07/1999	141300	8.187	23.082	188.658	0.078	29.938	298.476	66.714
18	12/07/1999	141400	8.259	23.220	188.561	0.078	29.939	299.089	66.714
19	12/07/1999	141500	8.246	23.341	189.458	0.078	29.939	299.441	66.714
20	12/07/1999	141600	8.269	23.614	189.454	0.079	29.937	299.755	66.714
21	12/07/1999	141700	8.206	23.230	188.407	0.078	29.935	301.440	66.714
22	12/07/1999	141800	8.213	23.194	188.274	0.078	29.936	301.451	66.714
23	12/07/1999	141900	8.232	23.347	188.840	0.078	29.937	300.590	66.714
24	12/07/1999	142000	8.255	23.587	188.015	0.079	29.939	300.598	66.714
25	12/07/1999	142100	8.249	23.522	188.241	0.079	29.936	300.969	66.714
26	12/07/1999	142200	8.261	23.517	189.117	0.079	29.936	301.183	66.714
27	12/07/1999	142300	8.271	23.777	190.194	0.079	29.937	300.439	66.714
28	12/07/1999	142400	8.272	23.634	189.794	0.079	29.933	297.237	66.714
29	12/07/1999	142500	8.219	23.587	190.611	0.079	29.935	297.258	66.714
30	12/07/1999	142600	8.269	23.619	190.639	0.079	29.935	300.170	66.714
31	12/07/1999	142700	8.253	23.534	190.256	0.079	29.938	300.301	66.714
32	12/07/1999	142800	8.241	23.527	189.416	0.079	29.938	299.458	66.714
33	12/07/1999	142900	8.214	23.269	189.884	0.078	29.938	299.151	66.714
34	12/07/1999	143000	8.238	23.320	189.616	0.078	29.938	300.203	66.714
35	12/07/1999	143100	8.246	23.548	189.372	0.079	29.939	301.090	66.714
36	12/07/1999	143200	8.256	23.629	189.516	0.079	29.934	300.408	66.714
37	12/07/1999	143300	8.228	23.562	189.882	0.079	29.936	298.916	66.714
38	12/07/1999	143400	8.218	23.579	188.811	0.079	29.939	298.808	66.714
39	12/07/1999	143500	8.248	23.623	188.965	0.079	29.937	298.305	66.714
40	12/07/1999	143600	8.235	23.535	188.959	0.079	29.935	298.256	66.714
41	12/07/1999	143700	8.206	23.577	189.365	0.079	29.934	299.478	66.714
42	12/07/1999	143800	8.175	23.565	190.010	0.080	29.936	299.474	66.714
43	12/07/1999	143900	8.172	23.653	190.205	0.080	29.937	298.702	66.714
44	12/07/1999	144000	8.205	23.935	189.326	0.080	29.936	298.483	66.714
45	12/07/1999	144100	8.214	23.947	189.297	0.080	29.936	299.664	66.714
46	12/07/1999	144200	8.222	24.108	189.542	0.081	29.936	300.434	66.714
47	12/07/1999	144300	8.210	23.755	189.281	0.080	29.938	299.640	66.714
48	12/07/1999	144400	8.207	23.823	189.361	0.080	29.938	298.518	66.714
49	12/07/1999	144500	8.199	24.014	189.908	0.081	29.934	298.550	66.714
50	12/07/1999	144600	8.199	23.673	190.211	0.080	29.933	298.912	66.714
51	12/07/1999	144700	8.184	23.864	189.562	0.080	29.936	298.901	66.714
52	12/07/1999	144800	8.193	23.525	189.221	0.079	29.939	299.761	66.714
53	12/07/1999	144900	8.197	23.607	189.435	0.079	29.937	299.875	66.714
54	12/07/1999	145000	8.211	23.669	189.439	0.080	29.936	301.233	66.714
55	12/07/1999	145100	8.190	23.688	189.082	0.080	29.936	301.677	66.714
56	12/07/1999	145200	8.181	23.534	189.278	0.079	29.937	301.359	66.714
57	12/07/1999	145300	8.185	23.875	190.278	0.080	29.937	301.060	66.714
58	12/07/1999	145400	8.224	23.889	190.124	0.080	29.936	300.373	66.714

59	12/07/1999	145500	8.227	24.202	189.467	0.081	29.935	299.532	66.714
60	12/07/1999	145600	8.222	23.793	189.388	0.080	29.936	298.940	66.714
61	/ /								
62	/ /	AVE	8.207	23.802	189.435	0.080	29.937	299.894	66.714

APPENDIX C

FIELD DATA SHEETS

APPENDIX C - 1 UNCORRECTED REFERENCE METHOD DATA SHEETS

APPENDIX C - 1

UNCORRECTED REFERENCE METHOD DATA SHEETS

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
09:26	12.26	22.5	15.4
09:27	12.25	22.5	15.3
09:28	12.25	22.4	15.3
09:29	12.28	22.3	15.2
09:30	12.29	22.4	15.3
09:31	12.29	22.4	15.4
09:32	12.29	22.5	15.4
09:33	12.28	22.6	15.5
09:34	12.28	22.4	15.3
09:35	12.28	22.2	15.2
09:36	12.27	22.2	15.2
09:37	12.27	22.1	15.1

AVERAGE VALUES FOR THE LAST 12 MINUTES

09:37	12.27	22.4	15.3

COMMENTS: o2 traverse
WEST PORT

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
09:44	12.33	22.4	15.4
09:45	12.32	22.2	15.3
09:46	12.28	22.4	15.3
09:47	12.30	22.2	15.2
09:48	12.31	22.2	15.2
09:49	12.26	22.1	15.1
09:50	12.24	22.3	15.2
09:51	12.29	22.2	15.2
09:52	12.42	22.0	15.3
09:53	12.44	21.6	15.1
09:54	12.45	21.5	15.0
09:55	12.50	21.6	15.1
AVERAGE VALUES FOR THE LAST 12 MINUTES			
09:55	12.34	22.1	15.2
09:56	12.71	21.4	15.4
09:57	12.70	21.3	15.3

COMMENTS: 02 TRAVERSE
SOUTH PORT

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
10:14	12.13	23.2	15.6
10:15	12.14	23.3	15.7
10:16	12.14	23.2	15.6
10:17	12.13	23.4	15.7
10:18	12.11	23.2	15.6
10:19	12.11	22.9	15.4
10:20	12.12	23.0	15.5
10:21	12.10	23.1	15.5
10:22	12.11	23.2	15.5
10:23	12.11	23.3	15.6
10:24	12.11	23.3	15.7
10:25	12.35	22.9	15.8

AVERAGE VALUES FOR THE LAST 12 MINUTES

10:25	12.14	23.2	15.6

COMMENTS: 02 TRAVERSE
EAST PORT

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
10:31	12.08	24.2	16.2
10:32	12.10	24.2	16.2
10:33	12.11	24.1	16.2
10:34	12.11	24.3	16.3
10:35	12.11	24.5	16.4
10:36	12.10	24.5	16.4
10:37	12.11	24.7	16.6
10:38	12.11	24.4	16.4
10:39	12.10	24.6	16.5
10:40	12.09	24.6	16.5
10:41	12.08	24.5	16.3
10:42	12.14	24.2	16.3

AVERAGE VALUES FOR THE LAST 12 MINUTES

10:42	12.10	24.4	16.4

COMMENTS: 02 TRAVERSE
NORTH PORT

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %O2	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%O2
11:22	11.76	22.4	14.5
11:23	11.75	22.5	14.5
11:24	11.76	22.4	14.5
11:25	11.79	22.3	14.4
11:26	11.80	22.5	14.6
11:27	11.78	22.6	14.6
11:28	11.78	22.9	14.8
11:29	11.80	22.9	14.8
11:30	11.80	22.9	14.9
11:31	11.80	23.0	14.9
11:32	11.80	23.0	14.9
11:33	11.80	23.1	14.9
11:34	11.78	23.2	15.0
11:35	11.78	22.9	14.8
11:36	11.77	23.2	15.0
11:37	11.76	23.1	14.9
11:38	11.75	23.2	15.0
11:39	11.75	23.0	14.9
11:40	11.74	23.2	15.0
11:41	11.77	23.0	14.9
11:42	11.78	23.2	15.0
11:43	11.76	23.3	15.0
11:44	11.75	23.3	15.0
11:45	11.75	23.4	15.1
11:46	11.76	23.5	15.2
11:47	11.76	23.7	15.3
11:48	11.73	23.5	15.1
11:49	11.72	23.5	15.1
11:50	11.73	23.4	15.0
11:51	11.73	23.6	15.2
11:52	11.71	23.6	15.2
11:53	11.71	23.4	15.0
11:54	11.73	23.6	15.2
11:55	11.74	24.1	15.5
11:56	11.73	24.5	15.8
11:57	11.74	24.5	15.8
11:58	11.74	24.8	16.0
11:59	11.75	24.8	16.0
12:00	11.76	24.8	16.0
12:01	11.74	24.9	16.1
12:02	11.74	25.0	16.1
12:03	11.74	24.9	16.0
12:04	11.74	24.8	15.9
12:05	11.74	25.0	16.1
12:06	11.72	25.1	16.1
12:07	11.71	25.1	16.1
12:08	11.71	25.2	16.2
12:09	11.71	24.9	16.0
12:10	11.71	25.0	16.0
12:11	11.73	25.1	16.2
12:12	11.72	25.3	16.3
12:13	11.70	25.5	16.4
12:14	11.74	25.3	16.3
12:15	11.71	25.6	16.4

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %O2	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%O2
12:17	11.74	25.7	16.5
12:18	11.72	25.7	16.5
12:19	11.70	25.8	16.5
12:20	11.70	25.6	16.4
12:21	11.69	25.7	16.5

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

12:21	11.75	24.0	15.5

COMMENTS: END RUN ONE

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
12:43	11.65	24.2	15.4
12:44	11.64	24.2	15.4
12:45	11.64	24.5	15.6
12:46	11.64	24.4	15.6
12:47	11.65	24.4	15.5
12:48	11.65	24.4	15.6
12:49	11.65	24.6	15.7
12:50	11.63	24.7	15.7
12:51	11.64	24.6	15.7
12:52	11.64	24.6	15.6
12:53	11.63	24.5	15.6
12:54	11.62	24.7	15.7
12:55	11.62	24.5	15.6
12:56	11.62	24.6	15.6
12:57	11.63	24.6	15.6
12:58	11.64	24.8	15.8
12:59	11.64	25.0	15.9
13:00	11.64	25.1	16.0
13:01	11.63	25.2	16.0
13:02	11.64	25.3	16.1
13:03	11.64	25.4	16.2
13:04	11.63	25.3	16.1
13:05	11.63	25.7	16.4
13:06	11.63	25.6	16.3
13:07	11.63	25.6	16.3
13:08	11.63	25.7	16.4
13:09	11.61	25.7	16.3
13:10	11.60	25.6	16.3
13:11	11.60	26.0	16.5
13:12	11.61	26.1	16.6
13:13	11.61	26.1	16.6
13:14	11.61	26.1	16.6
13:15	11.60	26.2	16.6
13:16	11.60	26.1	16.6
13:17	11.60	26.1	16.6
13:18	11.60	26.2	16.6
13:19	11.62	26.4	16.8
13:20	11.61	26.4	16.8
13:21	11.62	26.8	17.1
13:22	11.63	26.9	17.1
13:23	11.62	27.0	17.2
13:24	11.61	27.3	17.3
13:25	11.62	27.2	17.3
13:26	11.61	27.2	17.3
13:27	11.60	26.9	17.1
13:28	11.63	27.2	17.3
13:29	11.63	27.5	17.5
13:30	11.62	27.8	17.7
13:31	11.62	27.7	17.6
13:32	11.62	27.8	17.7
13:33	11.63	27.9	17.7
13:34	11.64	27.8	17.8
13:35	11.64	28.0	17.8
13:36	11.64	28.0	17.8

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %O2	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%O2
13:38	11.63	27.9	17.8
13:39	11.64	28.1	17.9
13:40	11.63	28.0	17.8
13:41	11.62	28.3	18.0
13:42	11.61	28.3	18.0

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

13:42	11.63	26.1	16.6

COMMENTS: END RUN TWO

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
13:58	11.65	24.6	15.7
13:59	11.64	24.7	15.8
14:00	11.65	24.9	15.9
14:01	11.65	25.4	16.2
14:02	11.64	25.4	16.2
14:03	11.64	25.5	16.2
14:04	11.65	25.6	16.3
14:05	11.64	25.6	16.3
14:06	11.91	24.6	16.1
14:07	11.91	24.9	16.3
14:08	11.90	24.8	16.3
14:09	11.87	24.5	16.0
14:10	11.85	24.0	15.7
14:11	11.83	24.0	15.6
14:12	11.84	24.2	15.7
14:13	11.85	24.3	15.9
14:14	11.85	24.3	15.8
14:15	11.84	24.2	15.7
14:16	11.85	24.3	15.8
14:17	11.85	24.4	15.9
14:18	11.86	24.4	15.9
14:19	11.86	24.3	15.8
14:20	11.85	24.5	16.0
14:21	11.86	24.5	16.0
14:22	11.85	24.4	15.9
14:23	11.85	24.3	15.9
14:24	11.84	24.3	15.8
14:25	11.85	24.2	15.8
14:26	11.85	24.2	15.8
14:27	11.86	23.8	15.5
14:28	11.86	23.6	15.4
14:29	11.86	23.6	15.4
14:30	11.85	23.6	15.4
14:31	11.85	23.2	15.2
14:32	11.85	23.1	15.1
14:33	11.84	22.8	14.9
14:34	11.86	22.8	14.9
14:35	11.86	22.7	14.8
14:36	11.86	22.6	14.8
14:37	11.84	22.6	14.7
14:38	11.85	22.6	14.7
14:39	11.85	22.5	14.7
14:40	11.85	22.5	14.7
14:41	11.85	22.3	14.5
14:42	11.84	22.2	14.4
14:43	11.83	22.1	14.4
14:44	11.83	22.0	14.3
14:45	11.83	21.9	14.3
14:46	11.83	21.7	14.1
14:47	11.84	21.8	14.2
14:48	11.85	21.8	14.2
14:49	11.86	21.9	14.3
14:50	11.88	22.0	14.4
14:51	11.88	22.2	14.5
14:52	11.88	22.1	14.5

POLK POWER STATION BACT STUDY #2 12-07-1999

TIME	CHAN 5 STACK %02	CHAN 3 STACK ppmNOX	STACK ppmNOX @15%02
14:53	11.89	22.0	14.4
14:54	11.88	21.9	14.3
14:55	11.88	21.8	14.3
14:56	11.88	21.8	14.3
14:57	11.88	21.8	14.3

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

14:57	11.83	23.5	15.3

COMMENTS: END RUN THREE

APPENDIX D

SAMPLING EQUIPMENT CALIBRATIONS

APPENDIX D-1 LINEARITY CALIBRATIONS

APPENDIX D-2 DRIFT ASSESSMENT CALS

APPENDIX D-3 CYLINDER GAS CERTIFICATION

APPENDIX D-4 CONVERTER EFFICIENCY RESULTS

APPENDIX D-1

LINEARITY CALIBRATIONS

CALIBRATION SUMMARY

SOURCE: POLK POWER STATION BACT STUDY #2

REASON: DAILY SYSTEM CAL

DATE : 12-07-1999 TIME: 07:33 - 07:55

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	-0.02
5	STACK	%02	11.96	12.12
5	STACK	%02	23.10	23.16
3	STACK	ppmNOX	0.0	0.8
3	STACK	ppmNOX	24.0	25.9
3	STACK	ppmNOX	48.6	50.5
3	STACK	ppmNOX	81.1	82.6

CALIBRATION SUMMARY

SOURCE: POLK POWER STATION BACT STUDY #2

REASON: POST-02 TRAVERSE CAL

DATE : 12-07-1999 TIME: 10:52 - 11:07

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	0.00
5	STACK	%02	11.96	12.14
5	STACK	%02	23.10	23.22
3	STACK	ppmNOX	0.0	0.6
3	STACK	ppmNOX	24.0	24.1
3	STACK	ppmNOX	48.6	49.9
3	STACK	ppmNOX	81.1	82.0

APPENDIX D-2

DRIFT ASSESSMENT CALS

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 1

SPAN VALUE: 25 % Oxygen

	-----INITIAL VALUES-----			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.00	0.00	0.00	0.01	0.04	0.04
O2 UP-SCALE	12.14	12.14	0.00	12.18	0.16	0.16

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

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

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 1

SPAN VALUES: 100 ppm NOx
25 % Oxygen

	——INITIAL VALUES——			——FINAL VALUES——		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.6	0.6	0.00	1.6	1.00	1.00
NOx UP-SCALE	24.1	24.1	0.00	25.1	1.00	1.00
O2 LOW GAS	0.00	0.00	0.00	0.01	0.04	0.04
O2 UP-SCALE	12.14	12.14	0.00	12.18	0.16	0.16

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

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

CALIBRATION SUMMARY

SOURCE: POLK POWER STATION BACT STUDY #2

REASON: RUN ONE DRIFT CAL

DATE : 12-07-1999 TIME: 12:31 - 12:34

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	0.01
5	STACK	%02	11.96	12.18
3	STACK	ppmNOX	0.0	1.6
3	STACK	ppmNOX	24.0	25.1

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 2

SPAN VALUE: 25 % Oxygen

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.00	0.01	0.04	-0.04	-0.16	-0.20
O2 UP-SCALE	12.14	12.18	0.16	12.08	-0.24	-0.40

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

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

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 2

SPAN VALUES: 100 ppm NOx
25 % Oxygen

	——INITIAL VALUES——			——FINAL VALUES——		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.6	1.6	1.00	2.1	1.50	0.50
NOx UP-SCALE	24.1	25.1	1.00	26.2	2.10	1.10
O2 LOW GAS	0.00	0.01	0.04	-0.04	-0.16	-0.20
O2 UP-SCALE	12.14	12.18	0.16	12.08	-0.24	-0.40

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

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

CALIBRATION SUMMARY

SOURCE: POLK POWER STATION BACT STUDY #2

REASON: RUN TWO DRIFT CAL

DATE : 12-07-1999 TIME: 13:42 - 13:45

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	-0.04
5	STACK	%02	11.96	12.08
3	STACK	ppmNOX	0.0	2.1
3	STACK	ppmNOX	24.0	26.2

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 3

SPAN VALUE: 25 % Oxygen

	------INITIAL VALUES------			------FINAL VALUES------		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.00	-0.04	-0.16	0.52	2.08	2.24
O2 UP-SCALE	12.14	12.08	-0.24	12.31	0.68	0.92

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

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

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

SOURCE: POLK POWER STATION UNIT 1 BACT STUDY

TEST DATE: 12/7/99

RUN NUMBER: 3

SPAN VALUES: 100 ppm NOx
25 % Oxygen

	——INITIAL VALUES——			——FINAL VALUES——		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.6	2.1	1.50	1.6	1.00	-0.50
NOx UP-SCALE	24.1	26.2	2.10	23.7	-0.40	-2.50
O2 LOW GAS	0.00	-0.04	-0.16	0.52	2.08	2.24
O2 UP-SCALE	12.14	12.08	-0.24	12.31	0.68	0.92

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

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

CALIBRATION SUMMARY

SOURCE: POLK POWER STATION BACT STUDY #2

REASON: RUN THREE DRIFT CAL

DATE : 12-07-1999 TIME: 14:57 - 15:00

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	STACK	%02	0.00	0.52
5	STACK	%02	11.96	12.31
3	STACK	ppmNOX	0.0	1.6
3	STACK	ppmNOX	24.0	23.7

APPENDIX D-3

CYLINDER GAS CERTIFICATION

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: N31923
Project No.: 12-33126-001

Customer

TAMPA ELECTRIC CO
RAY MCDARBY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: ALM020393 **Certification Date:** 3/11/99 **Exp. Date:** 3/11/2002
Cylinder Pressure*:** 2015 PSIG

COMPONENT	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY**	TRACEABILITY
OXYGEN	11.96 %	+/- 1%	NIST
NITROGEN	BALANCE		

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

** Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes. Product certified as +/- 1% analytical accuracy is directly traceable to NIST standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2658	1/02/01	ALM031884	9.680 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/16804-02	02/22/99	GC / TCD

ANALYZER READINGS

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

First Triad Analysis | Second Triad Analysis | Calibration Curve

OXYGEN

Date: 03/11/99	Response Unit: AREA	
Z1 = 0.0000	R1 = 247696	T1 = 306452
R2 = 248148	Z2 = 0.0000	T2 = 306564
Z3 = 0.0000	T3 = 306567	R3 = 248251
Avg. Concentration:	11.96	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.99999
Constants: A = 0.00
B = 1.00 C = 0.00
D = 0.00 E = 0.00

Special Notes:

APPROVED BY: B. M. Becton
B.M. BECTON

COMPLIANCE CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: EN31293
Project No.: 12-32820-001

Customer

TAMPA ELECTRIC CO
RAY MCDARBY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: AAL15873 **Certification Date:** 2/23/99 **Exp. Date:** 2/22/2002
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY**	TRACEABILITY
OXYGEN	23.1 %	+/- 2%	NIST
NITROGEN	BALANCE		

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

** Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2659	1/02/01	ALM031720	20.72 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/16804-02	02/22/99	GC / TCD

Dil #2

Special Notes:

APPROVED BY: B. M. Becton
B.M. BECTON

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: E-N31293
Project No.: 12-32332-014

Customer

TAMPA ELECTRIC CO
RAY MCDARBY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: ALM045301 Certification Date: 2/08/99 Exp. Date: 2/07/2001
Cylinder Pressure***: 1940 PSIG

COMPONENT	CERTIFIED CONCENTRATION		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	24.0	PPM	+/- 1%	NIST
NITROGEN - OXYGEN FREE		BALANCE		
NOX	24.9	BALANCE		Reference Value Only

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

** Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes. Product certified as +/- 1% analytical accuracy is directly traceable to NIST standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2629	4/09/99	ALM067006	21.48 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/CLA53A/850658093	02/08/99	CHEMILUMINESCENT

ANALYZER READINGS

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

NITRIC OXIDE

First Triad Analysis

Date: 02/01/99	Response Unit: PPM	
Z1 = 0.0500	R1 = 21.580	T1 = 24.100
R2 = 21.510	Z2 = 0.0300	T2 = 23.990
Z3 = 0.0300	T3 = 24.010	R3 = 21.520
Avg. Concentration:	23.97	PPM

Second Triad Analysis

Date: 02/08/99	Response Unit: PPM	
Z1 = 0.1900	R1 = 21.400	T1 = 24.050
R2 = 21.410	Z2 = 0.1600	T2 = 24.040
Z3 = 0.1600	T3 = 24.010	R3 = 21.410
Avg. Concentration:	24.09	PPM

Calibration Curve

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

Special Notes:

APPROVED BY: G T Barnett
G BARNETT

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: Interference Free™ EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: N75516
Project No.: 12-36341-002

Customer

TAMPA ELECTRIC CO
RAY MCDARBY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: ALM017813 Certification Date: 10/29/99 Exp. Date: 10/28/2001
Cylinder Pressure***: 1912 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	48.56	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	49.47	PPM		Reference Value Only

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

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM1683	4/03/03	ALM020566	48.90 PPM	NO/N2

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/8220/AAB9400252	10/22/99	Scott Enhanced FTIR

ANALYZER READINGS

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

NITRIC OXIDE

First Triad Analysis

Date:10/22/99	Response Unit:PPM	
Z1=-0.01310	R1=48.79556	T1=48.39187
R2=48.89616	Z2=0.16660	T2=48.61919
Z3=0.08300	T3=48.62870	R3=49.00827
Avg. Concentration:	48.55	PPM

Second Triad Analysis

Date: 10/29/99	Response Unit: PPM	
Z1=0.14850	R1=49.06593	T1=48.55658
R2=48.76309	Z2=0.12020	T2=48.59997
Z3=0.04920	T3=48.54071	R3=48.87097
Avg. Concentration:	48.57	PPM

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999990

Constants:	A=0.000000
B=1.000000	C=0.000000
D=0.000000	E=0.000000

APPROVED BY: _____
B.M. Becton

RATA CLASS CEMS-HAND-3

Scott Specialty Gases

Dual-Analyzed Calibration Standard

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

CERTIFICATE OF ACCURACY: Interference Free™ EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1750 EAST CLUB BLVD
DURHAM,NC 27704

P.O. No.: N31923
Project No.: 12-35046-001

Customer

TAMPA ELECTRIC CO

5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

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

Cylinder Number: ALM019127 Certification Date: 7/19/99 Exp. Date: 7/18/2001
Cylinder Pressure***: 1994 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	81.13	PPM	+/- 1%	Direct NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	81.82	PPM		Reference Value Only

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

** Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997. Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM1683	4/03/03	ALM020566	48.90 PPM	NO/N2

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR System/8220/AAB9400252	07/15/99	Scott Enhanced FTIR

ANALYZER READINGS

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

NITRIC OXIDE

First Triad Analysis

Date:07/12/99	Response Unit:PPM	
Z1=0.1222	R1=48.911	T1=80.909
R2=48.792	Z2=-0.077	T2=81.157
Z3=0.1565	T3=81.343	R3=48.996
Avg. Concentration:	81.14	PPM

Second Triad Analysis

Date: 07/19/99	Response Unit: PPM	
Z1=0.2335	R1=48.805	T1=81.051
R2=48.938	Z2=-0.005	T2=81.173
Z3=0.1145	T3=81.120	R3=48.957
Avg. Concentration:	81.11	PPM

Calibration Curve

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

APPROVED BY: B.M. Becton

APPENDIX D-4

CONVERTER EFFICIENCY RESULTS

TECO
TAMPA ELECTRIC

CORPORATE ENVIRONMENTAL SERVICES
MEMORANDUM

TO: Quality Assurance File

FROM: R.A. Mc Darby

DATE: 1, December, 1999

SUBJECT: NO2 to NO Converter Efficiency Test
40 CFR 60, Appendix A, Method 20
Section 5.6
Analyzer S/N 10A/R-19785-186

The following results detail the performance of the converter efficiency test on analyzer S/N 10A/R-19785-186:

Highest value recorded during the 30 minute test run =	46.88 ppm
Value recorded at the end of the 30 minute test run =	46.88 ppm
Percent of decrease =	0.0 %

These results indicate that the converter currently installed in the referenced analyzer meets the requirements of 40 CFR 60, Appendix A, Reference Method 20, § 5.6.

In accordance with the instructions contained in 40 CFR 60, Appendix A, Reference Method 20, sub-section 5.6.1; A sample was prepared using gas cylinder S/N ALM-019127 (certificate attached), diluted approximately 1:1 with 20.9% purified air. The sample was introduced into the analyzer through the sample port, and allowed to run for 30 minutes (12:58 – 13:28). The results from this run are attached for reference.

Raymond A. Mc Darby
Senior Environmental Technician
Corporate Environmental Services
Air & Audit Services

APPENDIX E

PROJECT PARTICIPANTS

TEST PARTICIPANTS

Corporate Environmental Services

Steven Kelly	Associate Technician
David Smith	Senior Environmental Technician

Polk Power Station

David Knapp	Environmental and Safety Engineer