FILE

Florida Power
A Progress Energy Company

July 18, 2002

Mr. Garry Kuberski
Florida Department of Environmental Protection
Central District
3319 Maguire Boulevard, Suite 232
Orlando, FL 32803-3767

Dear Mr. Kuberski:

Re: Intercession City Plant – Units P13 and P14
Initial Compliance Testing after Modification for Units P12 – P14
Permit: 0970014-006-AC / PSD-FL-268A

Please find enclosed the initial post-modification air emissions compliance testing for Units P13 and P14 at the Intercession City Plant. This testing will also serve as the annual compliance test for Units P13 and P14. The test report for Units P12 was previously submitted under separate cover.

The testing, which occurred on May 29th and May 30th, demonstrates compliance for NOx, VOC, CO and visual emissions on each fuel (natural gas and oil). Please contact Jamie Hunter at (727) 826-4363 if you have any questions or need additional information.

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

Sincerely,

Kris Edmondson
Plant Manager Central CT Sites/Responsible Official

jjh/JJH040

enclosure

EMISSION TEST REPORT

for
EMISSIONS COMPLIANCE
of
TWO GENERAL ELECTRIC FRAME 7EA TURBINES
P-13 & P-14
at the
INTERCESSION CITY POWER PLANT
near
INTERCESSION CITY, OSCEOLA COUNTY, FLORIDA

Prepared for
Florida Power Corporation

Test Dates: May 29-30, 2002

Cubix Job No. 7009

Prepared by

Cubix Corporation
http://www.cubixcorp.com

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TABLE OF CONTENTS

INTRODUCTION

Emission tests were conducted on two stationary gas turbines (P-13 and P-14) located at the Intercession City Power Plant near Intercession City, Florida. The purpose of these tests was to determine the compliance status of these units with regard to the Florida Department of Environmental Protection (FDEP) PSD Permit No. PSD-FL-268A, Project No. 0970014-006-AC, and 40 CFR 60 Subpart GG. The testing was conducted by Cubix Corporation of Austin, Texas on May 29 and 30, 2002.

Quantities of nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOC) were measured in the exhaust of the turbine.

The emission tests followed the procedures set forth in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 3a, 9, 10, 19, 20 and 25a. Table 1 summarizes the background information pertinent to these tests.

This report has been reviewed and approved for submittal by the following representatives:

Cubix Corporation	Florida Power Corporation

TABLE 1
BACKGROUND DATA

Owner/Operator:	Florida Power Corporation
Test Coordinator:	Florida Power Corporation One Power Plaza, 263 13th Avenue South, BB1A St. Petersburg, FL 33701-5511 Attn: Jamie Hunter, Environmental Engineer (727) 826-4363 TEL (727) 826-4216 FAX
Test Contractor:	Cubix Corporation 9225 US Highway 183 S. Austin, Texas 78747 Attn.: Tony Ruiz, Project Manager (512) 243-0202 TEL (512) 243-0222 FAX
Test Dates:	May 29-30, 2002
Location:	Intercession City, Florida.
Process Description:	The turbines are utilized for generation of electricity. Dry-low NOx burners are utilized for NOx control when fueled by natural gas. Water injection is utilized for NOx control when fueled by No. 2 fuel oil.
Emission Point:	Emissions were measured in the 7 ports located on the rectangular exhaust stack of each unit.
Test Methods:	Traverse point layout by EPA Method 1 O_2 and CO_2 concentrations and molecular weight by EPA Method 3a Stack moisture also by stoichiometry Opacity by EPA Method 9 CO concentration by EPA Method 10 Stack flow rates by EPA Method 19 NOx and O2 by EPA Method 20 THC concentration by EPA Method 25a
Regulatory Applications:	40 CFR 60 Subpart GG

SUMMARY OF RESULTS

Exhaust gases from the gas turbine generation units were tested to satisfy FDEP permit requirements. Cubix Corporation of Austin, Texas conducted this testing on May 29-30, 2002. The results of those tests are summarized in this section of the report.

Test Matrix

The test matrix consisted of three test runs at base load conditions while the unit was fueled with natural gas and also three runs at base load conditions while the unit was fueled with distillate fuel oil. This test procedure was performed for both Units P-13 and P-14.

During the 1-hour test runs conducted at base load, NOx, CO, THC, CO_2 and O_2 concentrations were continuously monitored via instrumental analysis. In addition, opacity was measured. Fuel samples of natural gas and distillate fuel oil were collected and subsequently analyzed for total sulfur content as an indirect measurement of SO_2 emissions.

Tables 2 and 3 provide the summaries while Unit P-13 was fueled with natural gas and distillate fuel respectively. Tables 4 and 5 provide the summaries while Unit P-14 was fueled with natural gas and distillate fuel respectively. These tables provide the pertinent unit operational data, ambient conditions, Cubix measurements, and calculated emissions during each test run.

The data used to generate these tables are supported by the documents presented in the appendices of this report. Appendix A contains a sketch of the stack and the traverse point layout. Examples of calculations used for the presentation of the data are contained in Appendix B. Turbine operational data provided by FPC is located in Appendix C. Summaries of the QA/QC activities are presented in Appendix D. Certifications of the calibration gases are included in Appendix E. Copies of the strip chart records from these tests are located in Appendix F. Fuel analyses and F-factor worksheets required for calculation of stack volumetric flow rates can be found in Appendix G. Opacity worksheets and observer certifications are presented in Appendix H.

Table 2: Summary of Results
Unit P-13 Full Load Testing
Natural Gas Fuel

Company: Florida Power Corporation
Plant: Intercession City Plant
Location: Intercession City, Osceola County, Florida
Technicians: TR, SO
Source: Unit P-13, a GE Frame 7EA Combustion Turbine

Test Number	P13-NG-1	P13-NG-2	P13-NG-3		FDEP Permit Limits
Date	5/30/02	5/30/02	5/30/02		
Start Time	11:26	12:37	13:50		
Stop Time	12:26	13:37	14:50		
Power Turbine Operation				*Averages*	
Generator Output (MW, DWATT)	77.4	76.6	76.3	***76.8***	
Heat Input (MMBtu/hr, LHV) (fuel meter run)	840.8	836.3	831.1	***836.1***	**905†**
Turbine Capacity (Mfg.'s Curve, Generator Output vs. T-1)	82.6	81.9	81.3	***81.9***	
Percent Load (% of maximum heat input at inlet temp)	93.8%	93.5%	93.8%	***93.7%***	
Barometric Pressure ("Hg, AFPAP)	29.7	29.6	29.6	***29.6***	
Air Inlet Duct Losses ("H_2O, AFPCS)	2.90	2.90	2.90	***2.90***	
Specific Humidity (CMHUM)	0.0265	0.0236	0.0215	***0.0239***	
Compressor Inlet Temperature (°F, CTIM)	86	88	90	***88***	
Engine Compressor Discharge Pressure (psia, CPD)	161.0	160.1	159.6	***160.2***	
Compressor Discharge Temperature (°F, CTD)	700	703	705	***703***	
Mean Turbine Exhaust Temperature (°F, TTXM)	1043	1044	1045	***1044***	
Inlet Guide Vane Angle (degrees, CSGV)	84.0	84.0	84.0	***84.0***	
Turbine Fuel Data (Natural Gas, FGT)					
Fuel Heating Value (Btu/lb, HHV)	23043	23043	23043	***23043***	
Fuel Heating Value (Btu/lb, LHV)	20761	20761	20761	***20760.8***	
Fuel Specific Gravity	0.5840	0.5840	0.5840	***0.5840***	
Sulfur in Fuel (grains/100 SCF of fuel gas)	0.003	0.003	0.003	***0.003***	**1.0**
O_2 "F_d Factor" (DSCFex/MMBtu @ 0% excess air)	8645	8645	8645	***8645***	
CO_2 "F_c Factor" (DSCFex/MMBtu @ 0% excess air)	1032	1032	1032	***1032***	
Gas Fuel Flow (FQG, lbs/sec from Mark V)	11.25	11.19	11.12	***11.19***	
Heat Input (MMBtu/hr, HHV, from Mark V)	933.2	928.3	922.5	***928.0***	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.83	29.83	29.77	***29.81***	
Temperature (°F): Dry bulb	89.0	92.0	92.0	***91.0***	
(°F): Wet bulb	78.0	78.0	77.0	***77.7***	
Humidity (lbs moisture/lb of air)	0.0177	0.0170	0.0161	***0.0169***	
Measured Emissions					
NO_X (ppmv, dry basis)	5.50	5.66	5.72	***5.62***	
NO_X (ppmv, dry @ 15% excess O_2)	**5.30**	**5.69**	**5.62**	***5.54***	**9.0**
NO_X (ppmv @ 15% O_2, ISO Day)	6.13	6.46	6.24	***6.28***	
CO (ppmv, dry basis)	5.33	4.30	4.16	***4.60***	
CO (ppmv, dry @15% excess O_2)	5.14	4.33	4.09	***4.52***	**20.0**
UHC (ppmv, wet basis)	0.18	0.01	0.28	***0.16***	**2.0**
Visible Emissions (% opacity)	N/A	N/A	0	***0***	**10**
O_2 (% volume, dry basis)	14.78	15.04	14.90	***14.91***	
CO_2 (% volume, dry basis)	3.50	3.46	3.50	***3.49***	
F_o (fuel factor, range = 1.600-1.836 for NG)	1.75	1.69	1.72	***1.72***	
Stack Volumetric Flow Rates (via EPA Method 19)					
via O_2 "F_d Factor" (SCFH, dry basis) (fuel meter run)	2.76E+07	2.86E+07	2.78E+07	***2.80E+07***	
via CO_2 "F_c Factor" (SCFH, dry basis) (fuel meter run)	2.75E+07	2.77E+07	2.72E+07	***2.75E+07***	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**18.1**	**19.3**	**19.0**	*18.8*	**33.0**
CO (lbs/hr)	**10.7**	**9.0**	**8.4**	*9.3*	**43.0**
UHC as VOC (lbs/hr)	**0.22**	**0.02**	**0.35**	*0.20*	**2.0**

† Permitted capacity is at a reference of: 59°F inlet temperature, 60% relative humidity, and 14.7 psia ambient air pressure.

Table 3: Summary of Results
Unit P-13 Full Load Testing
Distillate Oil Fuel

Company: Florida Power Corporation
Plant: Intercession City Plant
Location: Intercession City, Osceola County, Florida
Technicians: TR, SO
Source: Unit P-13, a GE Frame 7EA Combustion Turbine

Test Number	P13-FO-1	P13-FO-2	P13-FO-3		FDEP Permit Limits
Date	5/30/02	5/30/02	5/30/02		
Start Time	15:32	16:44	17:58		
Stop Time	16:32	17:44	18:58		
Power Turbine Operation				*Averages*	
Generator Output (MW, DWATT)	78.9	78.6	79.8	*79.1*	
Heat Input (MMBtu/hr, LHV) (Mark V fuel meter)	867.6	862.0	867.0	*865.5*	978†
Turbine Capacity (Mfg.'s Curve, Generator Output vs. T-1)	81.0	81.0	82.3	*81.5*	
Percent Load (% of maximum heat input at inlet temp)	97.4%	97.0%	96.9%	*97.1%*	
Barometric Pressure ("Hg, AFPAP)	29.50	29.50	29.50	*29.50*	
Air Inlet Duct Losses ("H_2O, AFPCS)	2.80	2.80	2.90	*2.83*	
Specific Humidity (CMHUM)	0.0206	0.0209	0.0259	*0.0225*	
Compressor Inlet Temperature (°F, CTIM)	91	91	87	*90*	
Engine Compressor Discharge Pressure (psia, CPD)	163.0	162.9	164.0	*163.3*	
Compressor Discharge Temperature (°F, CTD)	716	717	709	*714*	
Mean Turbine Exhaust Temperature (°F, TTXM)	1048	1048	1047	*1048*	
Inlet Guide Vane Angle (degrees, CSGV)	84.0	84.0	84.0	*84.0*	
Water Injection Rate (WQ, lbs/sec)	12.34	12.24	11.43	*12.00*	
Water to Fuel Ratio (WQJ, unitless)	0.888	0.887	0.823	*0.866*	
Turbine Fuel Data (Distillate Oil Fuel)					
Fuel Heating Value (Btu/lb, HHV)	19495	19495	19495	*19495*	
Fuel Heating Value (Btu/lb, LHV)	17351	17351	17351	*17351*	
Fuel Specific Gravity	0.8493	0.8493	0.8493	*0.8493*	
Sulfur in Fuel (% weight in fuel oil)	0.040	0.040	0.040	*0.040*	0.05
O_2 "F_d Factor" (DSCFex/MMBtu @ 0% excess air)	9167	9167	9167	*9167*	
CO_2 "F_c Factor" (DSCFex/MMBtu @ 0% excess air)	1444	1444	1444	*1444*	
Oil Fuel Flow (FQLM1, lbs/sec, from Mark V)	13.9	13.8	13.9	*13.9*	
Heat Input (MMBtu/hr, Higher Heat Value)	974.8	968.5	974.1	*972.5*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.74	29.80	29.75	*29.76*	
Temperature (°F): Dry bulb	93.0	84.0	84.0	*87.0*	
(°F): Wet bulb	76.0	77.5	77.0	*76.8*	
Humidity (lbs moisture/lb of air)	0.0150	0.0184	0.0180	*0.0171*	
Measured Emissions					
NO_X (ppmv, dry basis)	40.79	42.38	44.65	*42.60*	
NO_X (ppmv, dry @ 15% excess O_2)	**35.6**	**37.3**	**39.3**	***37.4***	**42.0**
NO_X (ppmv @ 15% O_2, ISO Day)	38.7	43.2	45.7	*42.5*	
CO (ppmv, dry basis)	4.02	3.48	3.02	*3.51*	
CO (ppmv, dry @15% excess O_2)	3.51	3.06	2.66	*3.08*	20.0
UHC (ppmv, wet basis)	0.60	0.01	1.42	*0.68*	4.0
Visible Emissions (% opacity)	N/A	0	N/A	0	10
O_2 (% volume, dry basis)	14.14	14.19	14.19	*14.17*	
CO_2 (% volume, dry basis)	4.98	4.99	4.95	*4.97*	
F_o (fuel factor, range = 1.260 to 1.413 for FO)	1.36	1.34	1.36	*1.35*	
Stack Volumetric Flow Rates					
via O_2 "F_d Factor" (SCFH, dry basis)	2.76E+07	2.77E+07	2.78E+07	*2.77E+07*	
via CO_2 "F_c Factor" (SCFH, dry basis)	2.83E+07	2.80E+07	2.84E+07	*2.82E+07*	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**138**	**142**	**152**	*144*	**169.0**
CO (lbs/hr)	**8.3**	**7.1**	**6.2**	*7.2*	**44.0**
UHC as VOC (lbs/hr)	**0.77**	**0.01**	**1.84**	*0.87*	**5.0**

† Permitted capacity is at a reference of: 59°F inlet temperature, 60% relative humidity, and 14.7 psia ambient air pressure.

Table 4: Summary of Results
Unit P-14 Full Load Testing
Natural Gas Fuel

Company: Florida Power Corporation
Plant: Intercession City Plant
Location: Intercession City, Osceola County, Florida
Technicians: TR, SO
Source: Unit P-14, a GE Frame 7EA Combustion Turbine

Test Number	P14-NG-1	P14-NG-2	P14-NG-3		FDEP Permit Limits
Date	5/28/02	5/28/02	5/28/02		
Start Time	12:25	13:45	15:07		
Stop Time	13:25	14:45	16:07		
Power Turbine Operation				*Averages*	
Generator Output (MW, DWATT)	78.9	77.9	77.3	***78.0***	
Heat Input (MMBtu/hr, LHV) (fuel meter run)	833.7	827.0	830.0	***830.2***	**905†**
Turbine Capacity (Mfg.'s Curve, Generator Output vs. T-1)	82.9	83.2	83.2	***83.1***	
Percent Load (% of maximum heat input at inlet temp)	95.2%	93.7%	92.9%	***93.9%***	
Barometric Pressure ("Hg, AFPAP)	29.8	29.7	29.7	***29.7***	
Air Inlet Duct Losses ("H_2O, AFPCS)	3.40	3.50	3.50	***3.47***	
Specific Humidity (CMHUM)	0.0224	0.0216	0.0214	***0.0218***	
Compressor Inlet Temperature (°F, CTIM)	85	84	84	***84***	
Engine Compressor Discharge Pressure (psia, CPD)	161.7	160.8	159.9	***160.8***	
Compressor Discharge Temperature (°F, CTD)	707	710	712	***710***	
Mean Turbine Exhaust Temperature (°F, TTXM)	1037	1038	1040	***1038***	
Inlet Guide Vane Angle (degrees, CSGV)	84.0	84.0	84.0	***84.0***	
Turbine Fuel Data (Natural Gas, FGT)					
Fuel Heating Value (Btu/lb, HHV)	23095	23095	23095	***23095***	
Fuel Heating Value (Btu/lb, LHV)	20807	20807	20807	***20807.3***	
Fuel Specific Gravity	0.5785	0.5785	0.5785	***0.5785***	
Sulfur in Fuel (grains/100 SCF of fuel gas)	0.012	0.012	0.012	***0.012***	**1.0**
O_2 "F_d Factor" (DSCFex/MMBtu @ 0% excess air)	8642	8642	8645	***8643***	
CO_2 "F_c Factor" (DSCFex/MMBtu @ 0% excess air)	1028	1028	1028	***1028***	
Gas Fuel Flow (FQG, lbs/sec from Mark V)	11.13	11.04	11.08	***11.08***	
Heat Input (MMBtu/hr, HHV, from Mark V)	925.4	917.9	921.2	***921.5***	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.83	29.83	29.80	***29.82***	
Temperature (°F): Dry bulb	87.0	90.0	91.0	***89.3***	
(°F): Wet bulb	76.0	77.0	78.0	***77.0***	
Humidity (lbs moisture/lb of air)	0.0164	0.0165	0.0172	***0.0167***	
Measured Emissions					
NO_X (ppmv, dry basis)	5.04	4.91	4.92	***4.96***	
NO_X (ppmv, dry @ 15% excess O_2)	**4.88**	**4.83**	**4.93**	***4.88***	**9.0**
NO_X (ppmv @ 15% O_2, ISO Day)	5.51	5.50	5.68	***5.56***	
CO (ppmv, dry basis)	9.93	10.07	8.99	***9.66***	
CO (ppmv, dry @15% excess O_2)	9.61	9.91	9.00	***9.51***	**20.0**
UHC (ppmv, wet basis)	0.49	0.22	0.18	***0.30***	**2.0**
Visible Emissions (% opacity)	N/A	N/A	0	***0***	**10**
O_2 (% volume, dry basis)	14.81	14.90	15.01	***14.90***	
CO_2 (% volume, dry basis)	3.47	3.47	3.42	***3.46***	
F_o (fuel factor, range = 1.600-1.836 for NG)	1.76	1.73	1.72	***1.73***	
Stack Volumetric Flow Rates (via EPA Method 19)					
via O_2 "F_d Factor" (SCFH, dry basis) (fuel meter run)	2.74E+07	2.76E+07	2.82E+07	***2.78E+07***	
via CO_2 "F_c Factor" (SCFH, dry basis) (fuel meter run)	2.74E+07	2.72E+07	2.77E+07	***2.74E+07***	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**16.5**	**16.2**	**16.6**	***16.4***	**33.0**
CO (lbs/hr)	**19.8**	**20.2**	**18.5**	***19.5***	**43.0**
UHC as VOC (lbs/hr)	**0.61**	**0.27**	**0.23**	***0.37***	**2.0**

† Permitted capacity is at a reference of: 59°F inlet temperature, 60% relative humidity, and 14.7 psia ambient air pressure.

Table 5: Summary of Results
Unit P-14 Full Load Testing
Distillate Oil Fuel

Company: Florida Power Corporation
Plant: Intercession City Plant
Location: Intercession City, Osceola County, Florida
Technicians: TR, SO
Source: Unit P-14, a GE Frame 7EA Combustion Turbine

Test Number	P14-FO-1	P14-FO-2	P14-FO-3		
Date	5/5/02	5/5/02	5/5/02		
Start Time	16:44	17:56	19:06		FDEP
Stop Time	17:44	18:56	20:06		Permit
Power Turbine Operation				*Averages*	Limits
Generator Output (MW, DWATT)	80.8	81.6	82.1	*81.5*	
Heat Input (MMBtu/hr, LHV) (Mark V fuel meter)	873.8	879.5	883.8	*879.0*	978†
Turbine Capacity (Mfg.'s Curve, Generator Output vs. T-1)	82.0	83.0	83.0	*82.6*	
Percent Load (% of maximum heat input at inlet temp)	98.5%	98.4%	99.0%	*98.6%*	
Barometric Pressure ("Hg, AFPAP)	29.70	29.70	29.70	*29.70*	
Air Inlet Duct Losses ("H_2O, AFPCS)	3.50	3.50	3.50	*3.50*	
Specific Humidity (CMHUM)	0.0246	0.0253	0.0254	*0.0251*	
Compressor Inlet Temperature (°F, CTIM)	88	85	85	*86*	
Engine Compressor Discharge Pressure (psia, CPD)	165.2	166.0	166.6	*165.9*	
Compressor Discharge Temperature (°F, CTD)	717	713	711	*714*	
Mean Turbine Exhaust Temperature (°F, TTXM)	1041	1040	1040	*1040*	
Inlet Guide Vane Angle (degrees, CSGV)	84.0	84.0	84.0	*84.0*	
Water Injection Rate (WQ, lbs/sec)	12.03	11.99	12.01	*12.01*	
Water to Fuel Ratio (WQJ, unitless)	0.860	0.852	0.849	*0.853*	
Turbine Fuel Data (Distillate Oil Fuel)					
Fuel Heating Value (Btu/lb, HHV)	19495	19495	19495	*19495*	
Fuel Heating Value (Btu/lb, LHV)	17351	17351	17351	*17351*	
Fuel Specific Gravity	0.8493	0.8493	0.8493	*0.8493*	
Sulfur in Fuel (% weight in fuel oil)	0.040	0.040	0.040	*0.040*	0.05
O_2 "F_d Factor" (DSCFex/MMBtu @ 0% excess air)	9167	9167	9167	*9167*	
CO_2 "F_c Factor" (DSCFex/MMBtu @ 0% excess air)	1444	1444	1444	*1444*	
Oil Fuel Flow (FQLM1, lbs/sec, from Mark V)	14.0	14.1	14.2	*14.1*	
Heat Input (MMBtu/hr, Higher Heat Value)	981.8	988.2	993.1	*987.7*	
Ambient Conditions					
Atmospheric Pressure ("Hg)	29.80	29.80	29.80	*29.80*	
Temperature (°F): Dry bulb	92.0	82.0	78.0	*84.0*	
(°F): Wet bulb	78.0	76.0	74.0	*76.0*	
Humidity (lbs moisture/lb of air)	0.0170	0.0176	0.0168	*0.0171*	
Measured Emissions					
NO_X (ppmv, dry basis)	39.86	40.47	40.08	*40.14*	
NO_X (ppmv, dry @ 15% excess O_2)	**34.7**	**35.2**	**34.9**	*34.9*	42.0
NO_X (ppmv @ 15% O_2, ISO Day)	39.3	40.7	39.7	*39.9*	
CO (ppmv, dry basis)	9.31	4.83	10.18	*8.10*	
CO (ppmv, dry @15% excess O_2)	8.09	4.20	8.85	*7.05*	20.0
UHC (ppmv, wet basis)	0.12	0.22	0.00	*0.11*	4.0
Visible Emissions (% opacity)	N/A	0	N/A	0	10
O_2 (% volume, dry basis)	14.11	14.11	14.11	*14.11*	
CO_2 (% volume, dry basis)	4.95	4.96	4.99	*4.97*	
F_o (fuel factor, range = 1.260 to 1.413 for FO)	1.37	1.37	1.36	*1.37*	
Stack Volumetric Flow Rates					
via O_2 "F_d Factor" (SCFH, dry basis)	2.77E+07	2.79E+07	2.80E+07	*2.79E+07*	
via CO_2 "F_c Factor" (SCFH, dry basis)	2.86E+07	2.87E+07	2.88E+07	*2.87E+07*	
Calculated Emission Rates (via M-19 O_2 "F-factor")					
NO_X (lbs/hr)	**136**	**139**	**138**	*138*	169.0
CO (lbs/hr)	**19.4**	**10.1**	**21.3**	*16.9*	44.0
UHC as VOC (lbs/hr)	**0.16**	**0.29**	**0.00**	*0.15*	5.0

† Permitted capacity is at a reference of: 59°F inlet temperature, 60% relative humidity, and 14.7 psia ambient air pressure.

PROCESS DESCRIPTION

Florida Power Corporation is the owner and operator of the Intercession City Power Plant near Intercession City, Florida. Emissions testing was conducted on two turbines in operation at that facility and this section of the test report provides a brief description of these units.

The facility utilizes these units to provide electricity to the local power grid. The turbines are General Electric Frame 7EA simple-cycle units. Dry-low NOx burners are utilized for NOx control when fueled by natural gas. Water injection is utilized for NOx control when fueled by No. 2 fuel oil.

Unit exhaust is vented to the atmosphere through a 9 ft X 19 ft rectangular stack approximately 56 ft above grade. Seven sample ports meeting EPA criteria are provided at the 45 ft level.

ANALYTICAL TECHNIQUE

The sampling and analysis procedures used during these tests conformed in principle with those outlined in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 3a, 9, 10, 19, 20, and 25a and ASTM methodology for the fuel analyses. The test procedures are discussed below. The stack gas analyses for NO_X, CO, THC/VOC, CO_2, and O_2 were performed by continuous instrumental monitors. Table 6 lists the instruments and detection principles used for these analyses.

The test matrix for each unit consisted of continuously monitoring NOx, CO, THC/VOC, CO_2, and O_2 concentrations at base throughout three 1-hour test runs. Ten 6-minute opacity observations were also conducted while operating at base load. A fuel sample was collected and subsequently analyzed for composition and total sulfur content. Method 19 stoichiometric calculations were utilized for all emission rate calculations. These procedures were performed while the units were fueled by natural gas, and subsequently while the units were fueled by distillate fuel oil.

The sampling and analysis system used to determine exhaust emission concentrations of NOx, CO, O_2, CO_2, and THC/VOC is depicted in Figure 1. Stack gas entered the sample system through a heated stainless steel probe with a glass wool filter. The sample was transported via 3/8-inch heat-traced Teflon® tubing using a stainless steel/Teflon® diaphragm pump to the wet portion of the sample manifold. This feature is designed to ensure that no condensation of heavy hydrocarbons will occur during THC sampling. The sample was then delivered to a Hartmann and Braun® sample conditioner, which dried the sample without removing the pollutants of interest before being passed back to the dry portion of the sample manifold. From the dry manifold, the sample was partitioned to the analyzers through glass and stainless steel rotameters that controlled the flow of the sample.

Figure 1 shows that the sampling system was equipped with a separate path through which a calibration gas could be delivered to the probe and back through the entire sampling system. This allowed for convenient performance tests of system bias checks and calibrations as required by the testing methods.

All instruments were housed in an air-conditioned mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with the concentrations certified by the vendor.

All data from the continuous monitoring instruments were recorded on two synchronized 3-pen strip chart recorders. These recorders were operated at a chart speed of 30 centimeters/hour and recorded over a 25-centimeter width. Strip chart records may be found in Appendix F of this report.

EPA Method 1 was utilized for selection of the traverse points for the compliance testing. The stack configurations and sample port locations did meet EPA Method 1 criteria.

The O_2 and CO_2 concentration measurements used in determination of stack gas molecular weight were measured in accordance with the procedures of EPA Method 3a and 20. Instrumental analyses were used in lieu of the Orsat or Fyrite techniques. A paramagnetic O_2 analyzer and an infrared absorption CO_2 analyzer were utilized for these emission tests.

EPA Method 9 was utilized for opacity observations throughout thirty 6-minute readings. The opacity observer has been EPA certified per Method 9. Method 9 Observation Worksheets can be found in Appendix H.

CO concentrations were quantified during the tests in accordance with procedures set forth in EPA Method 10. A continuous non-dispersive infrared (NDIR) analyzer was used for this purpose.

EPA Method 19 stoichiometric formulas were used for calculation of stack volumetric flow rates and mass emission rates of NOx, CO, SO_2 and VOC. These calculations were based on the fuel analysis data, diluent O_2 measurements, and plant provided fuel flow rates. Method 19 stoichiometry was also utilized as a means to calculate the moisture content of the stack gas.

Method 20 was used for measurement of NO_x and O_2 concentrations. A chemiluminescent cell analyzer was used for the NOx measurements and a paramagnetic analyzer utilized for the O_2 measurements.

In addition to the instrument test method requirements (Methods 10 and 20). Method 6c quality assurance procedures were also utilized throughout the testing in any cases where the Method 6c criterion is more stringent that another method requirements. For example, all zero/span checks were conducted through the entire sample system, which is not required by Methods 10 or 20. Additionally, Equation 6c-1 was used to correct all emission concentrations for zero and span drift.

VOC testing included measuring "total" hydrocarbons on a wet basis using a CAI (California Analytical Instrumentation) flame ionization analyzer calibrated in accordance with EPA Method 25a. Per the discussions, VOC emissions were determined based on THC measurements and the non-methane, non-ethane fraction of the fuel as found from the fuel analyses. Methane calibration standards were utilized for the tests and the emission concentrations are reported as methane equivalents and the mass emission rates were calculated using the molecular weight of methane.

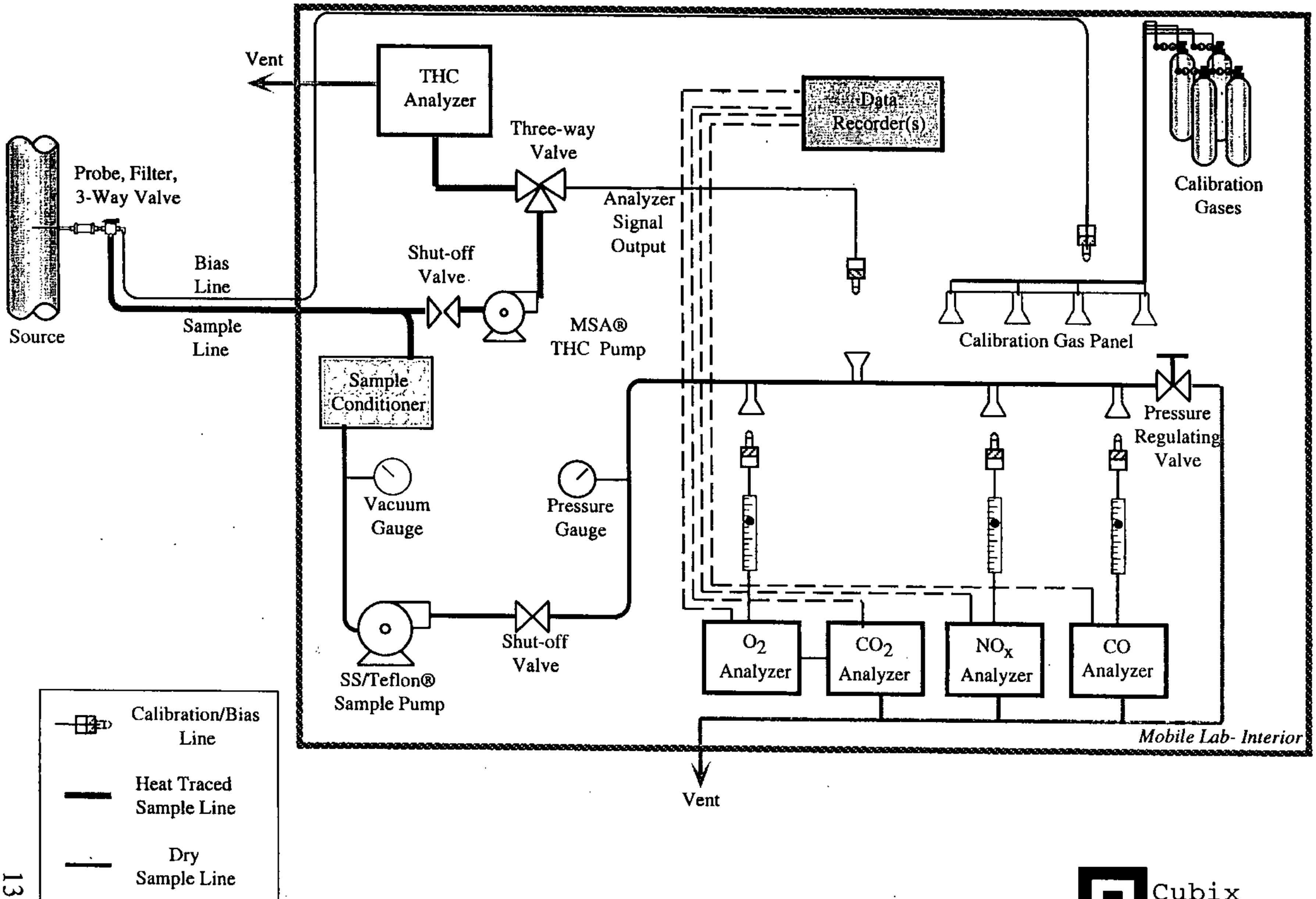
Atmospheric pressure was measured at the test site using a calibrated digital barometer. Ambient temperature and humidity were quantified during each test run via sling psychrometry.

Plant personnel provided key operational data. This data included turbine megawatts, fuel flow rates, and compressor discharge pressures. All plant provided operational data is contained in Appendix C.

TABLE 6
ANALYTICAL INSTRUMENTATION

Cubix Laboratory #603					
Parameter	**Model and Manufacturer**	**Common Ranges**	**Sensitivity**	**Response Time**	**Detection Principle**
NOx	API 200AH	0-10 ppm 0-100 ppm 0- 200 ppm 0-500 ppm 0-1000 ppm 0-5000 ppm	0.04 ppm	10 sec.	Thermal reduction of NO_2 to NO. Chemiluminescence reaction of NO with O_3. Detection by PMT. Inherently linear for listed ranges.
CO	Hartmann & Braun Uras 14	0-10 ppm 0-30 ppm 0-50 ppm 0-100 ppm 0-500 ppm 0-1000 ppm 0-5000 ppm	0.05 ppm	10 sec.	Infrared absorption, Microprocessor based linearization.
O_2	Hartman & Braun Magnos 16	0-5 % 0-25%	0.03%	10 sec.	Paramagnetic cell, Inherently linear.
CO_2	Hartmann & Braun Uras 14	0-5 % 0-25 %	0.03%	10 sec.	Infrared absorption, solid state detector.
THC	California Analytical 300-HFID	0-10 ppm 0-100 ppm 1-1K ppm 0-10K ppm 0-100K ppm	0.2 ppm	5 sec.	Flame ionization of Hydrocarbons inherently linear over 2 orders of magnitude.

FIGURE 1
INSTRUMENTAL SAMPLE SYSTEM DIAGRAM



Cubix Corporation

QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities were undertaken before, during, and after this testing project to ensure the accuracy of results obtained. This section of the report and the documentation contained in Appendices D and E describe each quality assurance activity that was performed.

With the exception of the fuel analysis, all sampling and analyses were conducted on-site to afford any interested parties the opportunity to observe all aspects of the test and to circumvent the possibility of sample loss or contamination during transport.

Each instrument's response was checked and adjusted in the field prior to the collection of data via multi-point calibration. The instrument's linearity was checked by first adjusting the zero and span responses to zero (nitrogen) and an upscale calibration gas in the range of the expected concentrations. The instrument response was then challenged with other calibration gases of known concentration and accepted as being linear if the response of the other calibration gases agreed within $\pm$ 2 percent of range of the predicted values. The strip chart excerpts that present the results of the initial multi-point linearity test are provided in Appendix D as are the Quality Assurance Worksheets.

In addition to the initial linearity checks, the calibration error checks were repeated as required throughout the tests. Anytime an adjustment was made to an analyzer, the calibration error test was repeated. Adjustment to the analyzer could have occurred for one of three reasons. If the post test run calibration check showed that the analyzer drift was approaching 3% (2% for Method 20), the technician may have chosen to reset the analyzer back to the correct setting before continuing with the next test run. If the drift exceeded 3% (but was less than 5%), the run is considered valid; however, adjustment to the analyzer is made before additional tests are conducted. Additionally, the analyzer span values could be changed. Anytime an adjustment was made to an analyzer for one of these reasons, the calibration error check (and bias check) was repeated before continuing. The Quality Assurance Worksheets of Appendix D summarize these calibration error checks.

Before and after each test run, the analyzers were checked for zero and span drift. This allowed each test run to be bracketed by calibrations and documented the precision of the data just collected. Documentation of drift also allowed for the use of Equation 6c-1 for correction of the observed emission concentrations. Calibrations were made through the entire sample system (via the bias check valve) at the end of every test run. The criterion for acceptable data is that the instrument drift is no more than 3 percent of the full-scale response. The quality assurance worksheets in Appendix D summarize all multipoint calibration checks and zero to span checks performed during the tests. These worksheets (as prepared from the strip chart records of Appendix F) show that there were no drifts in excess of 5% and that additional calibration error and bias checks were conducted for any drifts in excess of 3% (2% for Method 20).

Use of Equation 6c-1 requires documentation of both the initial and final zero and calibration responses. When two consecutive test runs were conducted one after the other, the final drift for the previous run was used for the initial calibration response of the subsequent run. In cases where there was a sufficient delay between test runs to deem this strategy invalid, a separate initial calibration was conducted and the response from this calibration was used in Equation 6c-1.

The instrumental sampling system was leak checked by demonstrating that a vacuum greater than 10" Hg could be held for at least 1 minute with a decline of less than 1" Hg. A leak test was conducted after a sample system was set up and before that system was dismantled. These tests were conducted to ensure that ambient air had not diluted the sample. Any leakage detected prior to the tests was repaired and another leak check conducted before testing commenced. No leaks were found during the post test leak checks.

The absence of leaks in the sampling system was also verified by system bias checks. The sampling system's integrity was tested by comparing the responses of each of the analyzers used to a calibration gas introduced via two paths. The first path was into the analyzer via the zero/span calibration manifold via the calibration error check. The second path was to introduce a calibration gas into the sample system at the sample probe via the calibration line and switching valve. Any difference in the instrument responses by these two methods was attributed to sampling system bias or leakage. Bias checks were conducted prior to and upon completion of testing for all analyzers. Examination of the strip chart excerpts in Appendix D show that the analyzer responses via both sample paths agreed within acceptable limits in all cases.

Bias checks were also conducted at other times throughout the tests as required by the test method. Anytime adjustment to the analyzer or drift in excess of 3% was recorded necessitated a repeat of the calibration error check, the bias check was also repeated. All bias check results are summarized in the Quality Assurance Worksheets of Appendix D.

Prior to testing on each unit, a NO_X converter efficiency check was conducted as required by EPA Methods 7e and 20. To conduct this test, a NO_X calibration gas was blended with air in a Tedlar® bag. Over a 30-minute period, the NO_X concentration was monitored and the NO concentration checked at 5-minute intervals via bypassing of the converter. As shown on the Instrumental Quality Assurance Worksheet of Appendix D, there was no appreciable drop in NO_X concentration (<2%) over the 30-minute period. Appendix D provides the results of the initial converter efficiency check.

Interference response tests on the instruments were conducted by the instrument vendors and Cubix Corporation on the NO_X, CO, CO_2, and O_2, analyzers. The sum of the interference responses for H_2O, NO_X, CO, SO_2, CO_2 and O_2 (as appropriate for each analyzer) are less than 2 percent of the applicable full-scale span value. The instruments used for the tests meet the performance specifications for EPA Methods 3a, 20, 7e, and 10. The results of these direct interference tests are available in Appendix E of this report.

The residence time of the sampling and measurement system was estimated using the pump flow rate and the sampling system volume. The pump's rated flow is 0.8 SCFM at 5 psig. The sampling system volume is 0.13 scf. Therefore, the sample residence time is approximately 10 seconds.

Response time tests were conducted on site on the sample system utilized during the tests. These tests were conducted simultaneously with the initial bias checks and are documented on the Instrumental Quality Assurance Worksheet of Appendix D. Method 20 response time tests were also conducted for the NOx and O_2 sample systems. The response times were found to be just less than one minute.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to ± 1% accuracy or EPA Protocol 1. The gas calibration sheets as prepared by the vendor are contained in Appendix E.

Appendix E contains calibration data on the digital barometer used during this testing.

Cubix collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. Cubix makes no warranty as to the suitability of the test methods. Cubix assumes no liability relating to the interpretation and use of the test data.