



AIR HYGIENE, INC.

Testing Solutions for a Better World

EMISSION COMPLIANCE TEST  
FOR THE  
BABCOCK AND WILCOX AUXILIARY BOILER,  
PERMIT ID NUMBER 009  
PREPARED FOR  
FLORIDA POWER AND LIGHT  
AT THE  
WEST COUNTY ENERGY CENTER

LOXAHATCHEE, FLORIDA

JULY 30, 2009  
Emission Testing Services

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airhygiene.com



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RECEIVED

Florida Power & Light Company  
West County Energy Center – Unit 1&2  
Permit No. – PSD-FL-354  
DEP File No. – 0990646-001-AC

SEP 25 2009  
BUREAU OF AIR REGULATION  
WCPP Project 144553  
WCPP Files 14.0200/32.0440  
WCPP-2009-TP-540  
September 24, 2009

E-mail, Express Mail

Ms. Trina Vielhauer  
Florida Department of Environmental Protection  
Division of Air Resource Management  
Bureau of Air Regulation, Bureau Chief  
2600 Blair Stone Road, MS 5500  
Tallahassee, FL 32399-2400

Subject: Permit Emissions Compliance Test Report  
Babcock and Wilcox Auxiliary Boiler  
Permit ID Number 009

Dear Ms. Vielhauer:

On behalf of Florida Power & Light Company (FPL) and its Designated Representative, Sheila M. Wilkinson, the West County Power Partners, LLC (WCPP), EPC Contractor for construction of the new combined cycle generating unit at the FPL West County Energy Center – Units 1&2, is sending you copies of the Permit Emissions Compliance Test Report for the Babcock and Wilcox Auxiliary Boiler per 40 CFR 63.7.

If you have any questions about this project, please contact Terry Apple at (913) 458-7220 or John Tidwell at (561) 784-8048.

Very truly yours,

WEST COUNTY POWER PARTNERS, LLC



*for* Chet Lloyd  
Project Executive

Enclosures – Hard copy and CD

WS:hs

cc: Dave McNeal, USEPA Air, Pesticides and Toxics Management  
Kevin Tran, USEPA Clean Air Markets Division  
Errin Pichard, FDEP Air Resource Management  
Lee Hoefert, FDEP Southeast District  
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Tom Cascio, FDEP Bureau of Air Regulation  
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Carmine Priore, FPL Plant General Manager  
Chet Lloyd, WCPP Project Executive  
John Tidwell, WCPP Senior Project Manager  
Pat Odell, WCPP Site Environmental Manager  
Terry Apple, WCPP Project Manager/ Project File - Hard copy of report and CD  
William Stevenson, WCPP Environmental Specialist  
(all without enclosures except as indicated above)



**Air Hygiene International, Inc.**

**EMISSION  
COMPLIANCE  
TEST**

**BABCOCK AND WILCOX  
AUXILIARY BOILER  
PERMIT ID 0009**

**FLORIDA POWER AND LIGHT  
WEST COUNTY ENERGY CENTER  
LOXAHATCHEE, FLORIDA  
JULY 30, 2009**

**EMISSION COMPLIANCE TEST  
FOR THE  
BABCOCK AND WILCOX AUXILIARY BOILER,  
PERMIT ID NUMBER 009  
PREPARED FOR  
FLORIDA POWER AND LIGHT  
AT THE  
WEST COUNTY ENERGY CENTER  
LOXAHATCHEE, FLORIDA  
JULY 30, 2009**

Prepared and Reviewed by:



Thomas K. Graham, P.E., QSTI, Director of Operations



Paul Little, Director of Customer Service



Jake Fahlenkamp, QSTI, Director of Quality Assurance

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**Emissions Compliance Test  
Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009  
Florida Power and Light  
West County Energy Center  
Loxahatchee, Florida  
July 30, 2009**

## **1.0 INTRODUCTION**

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), opacity, sulfur content of natural gas, and oxygen (O<sub>2</sub>) from the exhaust of the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009 for Florida Power and Light at the West County Energy Center near Loxahatchee, Florida. This report details the background, results, process description, and the sampling/analysis methodology of the stack sampling survey conducted on July 30, 2009.

## **1.1 TEST PURPOSE AND OBJECTIVES**

The purpose of the test was to conduct an initial compliance emission test to document levels of selected pollutants at 100%. The information will be used to confirm compliance with the operating permit issued by the Florida Department of Environmental Protection (FDEP). The specific objective was to determine the emission concentration of NO<sub>x</sub>, CO, opacity, sulfur content of natural gas, and O<sub>2</sub> from the exhaust of Florida Power and Light's Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009 at 100% of total capacity.

## **1.2 SUMMARY OF TEST PROGRAM**

The following list details pertinent information related to this specific project:

- 1.2.1 Participating Organizations
  - Florida Department of Environmental Protection (FDEP)
  - Black and Veatch
  - Florida Power and Light
  - Air Hygiene
- 1.2.2 Industry
  - Electric Utility / Electric Services
- 1.2.3 Air Permit
  - Permit Number: PSD-FL-354
  - Emission ID Number: 009
- 1.2.4 Plant Location
  - West County Energy Center near Loxahatchee, Florida
- 1.2.5 Equipment Tested
  - Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009
- 1.2.6 Emission Points
  - Exhaust from the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009
  - For all gases, one sample point in the exhaust duct from the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009, determined after conducting a stratification test (refer to Appendix F)
  - For opacity, one sample visual observation point from the exit of the exhaust duct to the atmosphere from the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009

- 1.2.7 Pollutants Measured
  - NOx
  - CO
  - Sulfur content in natural gas
  - Opacity
  - O<sub>2</sub>
- 1.2.8 Date of Emission Test
  - July 30, 2009

### 1.3 KEY PERSONNEL

Black and Veatch:	William Stevenson	913-458-8549
Air Hygiene:	Jake Fahlenkamp	918-307-8865
Air Hygiene:	Ahte Hussain	918-307-8865

### 2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Florida Power and Light's Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009 located at the West County Energy Center on July 30, 2009 are summarized in the following table.



**TABLE 2.1**  
**SUMMARY OF BABCOCK AND WILCOX, PERMIT ID NUMBER #009**  
**RESULTS**

Parameter	Full Load	Permit Limits
Start Time (hh:mm:ss)	14:45:25	--
End Time (hh:mm:ss)	18:01:55	--
Run Duration (min / run)	60	--
Bar. Pressure (in. Hg)	29.97	--
Amb. Temp. (°F)	86	--
Rel. Humidity (%)	69	--
Spec. Humidity (lb water / lb air)	0.018784	--
Aux Boiler Fuel Flow (SCFH)	90,378	--
Stack Flow (RM19) (SCFH)	1,063,085	--
Heat Input (MMBtu/hr)	90.1	--
Steam Flow Rate (lb/hr)	59,679.3	--
Jackshaft Positioner (%)	100.0	--
Feedwater Flow (lb/hr)	70,876.43	--
Firing Rate Demand (%)	100.0	--
Steam Drum Pressure (PSIG)	336.25	--
Steam Drum Temp. (°F)	427.55	--
Steam Flow Pressure (PSIG)	301.76	--
Steam Header Temp. (°F)	600.47	--
CT-A Cooling STM Flow (lb/hr)	0.04	--
CT-B Cooling STM Flow (lb/hr)	134.67	--
CT-C Cooling STM Flow (lb/hr)	112.67	--
Fuel Gas Pressure (PSIG)	26.41	--
NOx (ppmvd)	33.36	--
NOx (ppm@3%O <sub>2</sub> )	39.01	--
NOx (lb/MMBtu)	0.047	0.05
CO (ppmvd)	0.29	--
CO (ppm@3%O <sub>2</sub> )	0.34	--
CO (lb/MMBtu)	0.000	0.08
Sulfur (gr/100 scf)	<0.032	2
Opacity (%)	0	10
O <sub>2</sub> (%)	5.59	--

The results of all measured pollutant emissions were below the required limits. All testing was performed without any real or apparent errors. All testing was conducted according to the approved testing protocol.

### 3.0 SOURCE OPERATION

#### 3.1 PROCESS DESCRIPTION

The unit tested was a Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009. The Boiler has a heat input of 99.77 MMBtu/hr and produces steam during start up of the Combustion Turbine Generators (CTGs).

#### 3.2 SAMPLING LOCATION

The Boiler stack is circular and measures 5.5 feet (ft) (66 inches) in diameter at the test ports which are approximately 53.125 ft above grade level with an exit elevation of approximately 60 ft above grade level. The test ports are located approximately 27 ft (324 inches) downstream and approximately 6.875 ft (82.5 inches) upstream from the nearest disturbances. All exhaust samples for gaseous emissions were continuously drawn from the exhaust system at the sample ports from a single point determined after conducting a stratification test (Appendix F). During the stratification test six points were traversed from two ports. The probe was allowed to remain at a point for two times the system response time. All opacity observations were made by viewing the point where the exhaust system exited to the atmosphere at the top of the exhaust stack.

### 4.0 SAMPLING AND ANALYTICAL PROCEDURES

#### 4.1 TEST METHODS

The emission test on the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009 at the West County Energy Center was performed following United States Environmental Protection Agency (EPA) methods described by the Code of Federal Regulations (CFR). Table 4.1 outlines the specific methods performed on July 30, 2009.

**TABLE 4.1  
SUMMARY OF SAMPLING METHODS**

Pollutant or Parameter	Sampling Method	Analysis Method
Sample Point Location	EPA Method 1	Equal Area Method
Oxygen	EPA Method 3a	Paramagnetic Cell
Nitrogen Oxides	EPA Method 7e	Chemiluminescent Analyzer
Opacity	EPA Method 9	Visual Observation
Carbon Monoxide	EPA Method 10	Nondispersive Infrared Analyzer
Stack Flow Rate	EPA Method 19	Dry Oxygen F Factor
Sulfur Content Analysis	ASTM D 6667	Fuel Gas Sample and Laboratory Analysis

## 4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 3a, 7e, 9, 10, and 19.

Figure 4.1 depicts the sample system used for the NO<sub>x</sub>, CO, and O<sub>2</sub> tests. A stainless steel probe with was inserted into the sample ports of the stack to extract gas measurements from the emission stream at a single point in the stack determined after passing an initial stratification test. The gas sample was continuously pulled through the probe and transported, via heat-traced Teflon® tubing, to a stainless steel minimum-contact condenser designed to dry the sample. Transportation of the sample, through Teflon® tubing, continued into the sample manifold within the mobile laboratory via a stainless steel/Teflon® diaphragm pump. From the manifold, the sample was partitioned to the NO<sub>x</sub>, CO, and O<sub>2</sub> analyzers through rotameters that controlled the flow rate of the sample.

Figure 4.1 shows that the sample system was also 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 of system bias checks as required by the testing methods.

All instruments were housed in an air-conditioned, trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with the concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e. NO<sub>x</sub> calibration gases).

Table 4.2 provides a description of the analyzers used for the instrument portion of the tests. All data from the continuous monitoring instruments were recorded on a Logic Beach Portable Data Logging System Hyperlogger which retrieves calibrated electronic data from each instrument every one second and reports an average of the collected data every 30 seconds. Data records can be found in Appendix A and B of this report.

Three test runs of approximately 60 minutes each were conducted on the Babcock and Wilcox Auxiliary Boiler, Permit ID Number 009 at the maximum available load for NO<sub>x</sub>, CO, and O<sub>2</sub>. Three runs of approximately 60 minutes each were conducted for at the maximum available load.

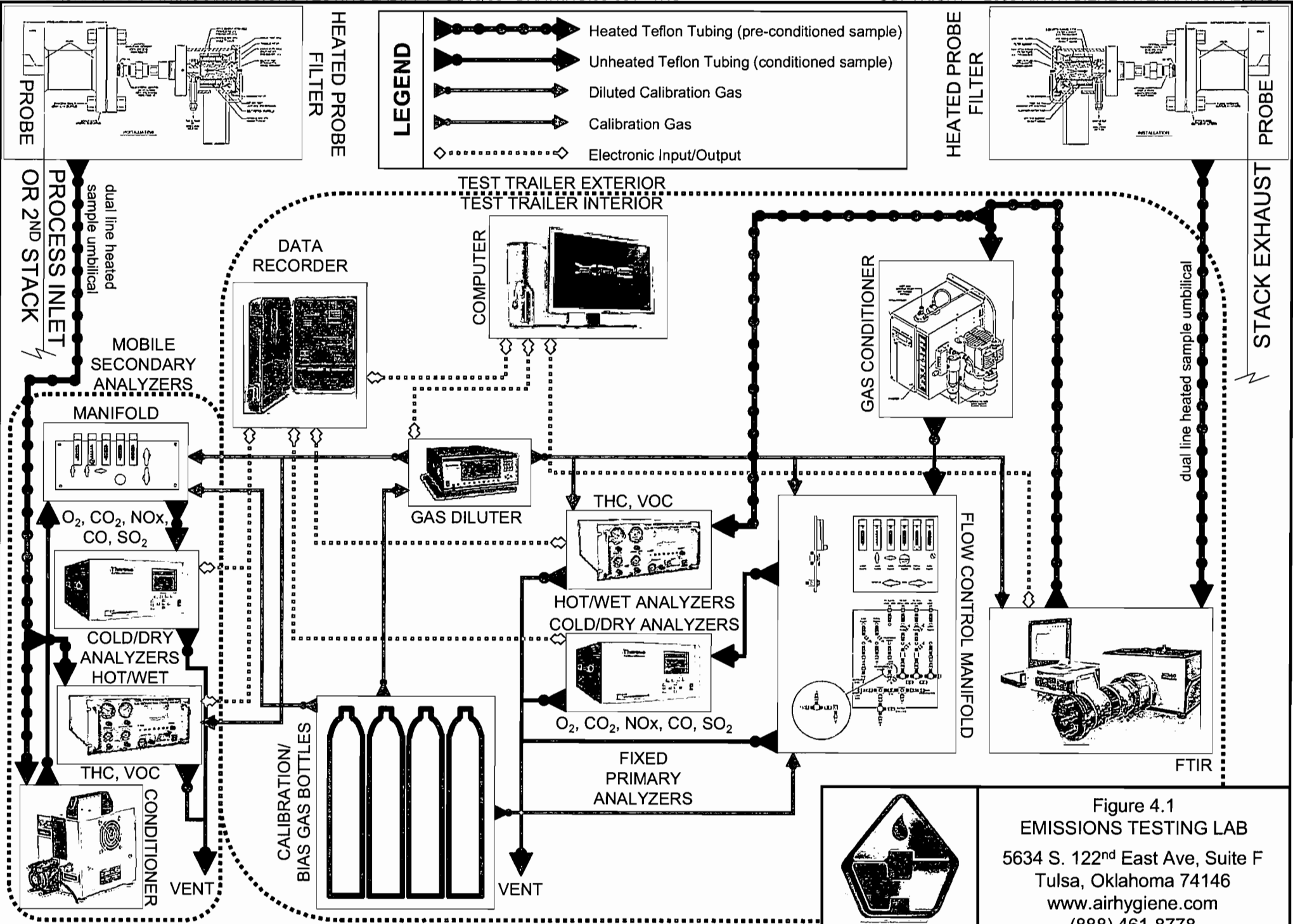
The stack gas analysis for O<sub>2</sub> concentrations was performed in accordance with procedures set forth in EPA Method 3a. The O<sub>2</sub> analyzer uses a paramagnetic cell.

EPA Method 7e was used to determine concentrations of NO<sub>x</sub>. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO<sub>2</sub> in nitrogen certified gas cylinder was used to verify at least a 90 percent NO<sub>2</sub> conversion on the day of the test.

CO emission concentrations were quantified in accordance with procedures set forth in EPA Method 10. A continuous nondispersive infrared (NDIR) analyzer was used for this purpose.

**TABLE 4.2  
ANALYTICAL INSTRUMENTATION**

Parameter	Model and Manufacturer	Range	Sensitivity	Detection Principle
NO <sub>x</sub>	THERMO 42C	User may select up to 10,000 ppm	0.1 ppm	Thermal reduction of NO <sub>2</sub> to NO. Chemiluminescence of reaction of NO with O <sub>3</sub> . Detection by PMT. Inherently linear for listed ranges.
CO	THERMO 48C	User may select up to 10,000 ppm	0.1 ppm	Infrared absorption, gas filter correlation detector, microprocessor based linearization.
O <sub>2</sub>	CAI 200	0-25%	0.1%	Paramagnetic cell, inherently linear.



Shown fully equipped. Some labs may not contain these features and others may contain additional features specific to certain scopes.



**Figure 4.1**  
**EMISSIONS TESTING LAB**  
 5634 S. 122<sup>nd</sup> East Ave, Suite F  
 Tulsa, Oklahoma 74146  
 www.airhygiene.com  
 (888) 461-8778

**APPENDIX A**  
**TEST RESULTS AND CALCULATIONS**

**TABLE A.1:  
EMISSIONS TESTING SCHEDULE**

<b>Unit</b>	<b>Load</b>	<b>Test Type</b>	<b>Run</b>	<b>Date</b>	<b>Start</b>	<b>Stop</b>	<b>Time Sync</b>
009	Full	Stratification Test	1	07/30/09	10:00:05	10:39:05	DAHS
009	Full	Compliance	1-1	07/30/09	14:45:25	15:44:55	DAHS
009	Full	Compliance	1-2	07/30/09	15:54:25	16:53:55	DAHS
009	Full	Compliance	1-3	07/30/09	17:02:25	18:01:55	DAHS
009	Full	Opacity	1	07/30/09	14:45:00	15:45:00	DAHS
009	Full	Opacity	2	07/30/09	15:45:00	16:45:00	DAHS
009	Full	Opacity	3	07/30/09	16:45:00	17:45:00	DAHS

Note: DAHS Time is EST

**TABLE A.2  
BABCOCK AND WILCOX, PERMIT ID NUMBER #009 FULL LOAD DATA SUMMARY**

Parameter	Full Load, Run - 1-1	Full Load, Run - 1-2	Full Load, Run - 1-3	Average
Start Time (hh:mm:ss)	14:45:25	15:54:25	17:02:25	14:45:25
End Time (hh:mm:ss)	15:44:55	16:53:55	18:01:55	18:01:55
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.21	29.88	29.83	29.97
Amb. Temp. (°F)	86	87	86	86
Aux Boiler Fuel Flow (SCFH)	90,932	90,434	89,769	90,378
Stack Flow (RM19) (SCFH)	1,072,275	1,057,563	1,059,417	1,063,085
Heat Input (MMBtu/hr)	90.6	90.1	89.5	90.1
Steam Flow Rate (lb/hr)	59,713.5	60,017.4	59,307.1	59,679.3
Jackshaft Positioner (%)	100.0	100.0	100.0	99.99
Feedwater Flow (lb/hr)	70,701.9	71,041.2	70,886.1	70,876.43
Firing Rate Demand (%)	100.0	100.0	100.0	99.99
Steam Drum Pressure (PSIG)	336.1	336.4	336.3	336.25
Steam Drum Temp. (°F)	427.3	427.8	427.6	427.55
Steam Flow Pressure (PSIG)	301.9	301.8	301.6	301.76
Steam Header Temp. (°F)	600.3	600.6	600.5	600.47
CT-A Cooling STM Flow (lb/hr)	0.0	0.0	0.0	0.04
CT-B Cooling STM Flow (lb/hr)	141.1	141.1	121.8	134.67
CT-C Cooling STM Flow (lb/hr)	107.1	115.2	115.7	112.67
Fuel Gas Pressure (PSIG)	26.6	26.4	26.2	26.41
NOx (ppmvd)	33.52	33.68	32.87	33.36
NOx (ppm@3%O <sub>2</sub> )	39.31	39.16	38.57	39.01
NOx (lb/MMBtu)	0.047	0.047	0.046	0.047
CO (ppmvd)	0.28	0.30	0.29	0.29
CO (ppm@3%O <sub>2</sub> )	0.33	0.35	0.34	0.34
Sulfur (gr/100 scf)	<0.032	<0.032	<0.032	<0.032
Opacity (%)	0	0	0	0
O <sub>2</sub> (%)	5.63	5.51	5.65	5.59



**TEST RESULTS AND CALCULATIONS**

**Emissions Data**

**Florida Power and Light**  
**July 30, 2009**  
**Babcock and Wilcox, Permit ID Number #009**  
**West County Energy Center**

**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,932	SCFH

**Weather Data**

Barometric Pressure	30.21	in. Hg
Relative Humidity	70	%
Ambient Temperature	86	°F
Specific Humidity	0.018611	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	91	MMBtu/hr
Steam Rate	59,714	Steam lb/hr
Stack Exhaust Flow (M19)	1,072,275	SCFH

Full Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
07/30/09 14:45:25	22479	5.56	32.95	0.07
07/30/09 14:45:55	22509	5.55	32.05	0.12
07/30/09 14:46:25	22539	5.48	31.89	0.08
07/30/09 14:46:55	22569	5.55	32.83	0.13
07/30/09 14:47:25	22599	5.53	32.84	0.10
07/30/09 14:47:55	22629	5.49	32.67	0.11
07/30/09 14:48:25	22659	5.51	32.46	0.11
07/30/09 14:48:55	22689	5.54	32.56	0.10
07/30/09 14:49:25	22719	5.44	32.64	0.10
07/30/09 14:49:55	22749	5.47	32.61	0.04
07/30/09 14:50:25	22779	5.50	33.01	0.17
07/30/09 14:50:55	22809	5.55	32.82	0.13
07/30/09 14:51:25	22839	5.57	32.35	0.14
07/30/09 14:51:55	22869	5.54	32.29	0.06
07/30/09 14:52:25	22899	5.58	32.30	0.10
07/30/09 14:52:55	22929	5.76	32.38	0.06
07/30/09 14:53:25	22959	5.77	31.95	0.08
07/30/09 14:53:55	22989	5.74	31.72	0.09
07/30/09 14:54:25	23019	5.74	31.70	0.09
07/30/09 14:54:55	23049	5.75	32.02	0.07
07/30/09 14:55:25	23079	5.72	31.51	0.05
07/30/09 14:55:55	23109	5.74	31.68	0.07
07/30/09 14:56:25	23139	5.75	31.58	0.09
07/30/09 14:56:55	23169	5.71	31.45	0.11
07/30/09 14:57:25	23199	5.67	31.84	0.08
07/30/09 14:57:55	23229	5.68	32.46	0.05
07/30/09 14:58:25	23259	5.68	31.66	0.07
07/30/09 14:58:55	23289	5.63	31.71	0.06
07/30/09 14:59:25	23319	5.66	31.82	0.09
07/30/09 14:59:55	23349	5.66	31.86	0.06
07/30/09 15:00:25	23379	5.63	31.89	0.06
07/30/09 15:00:55	23409	5.69	32.83	0.07
07/30/09 15:01:25	23439	5.69	31.89	0.11
07/30/09 15:01:55	23469	5.67	31.94	0.08
07/30/09 15:02:25	23499	5.64	32.66	0.06
07/30/09 15:02:55	23529	5.60	32.65	0.06
07/30/09 15:03:25	23559	5.58	32.35	0.08
07/30/09 15:03:55	23589	5.57	32.66	0.08
07/30/09 15:04:25	23619	5.57	32.56	0.08
07/30/09 15:04:55	23649	5.57	32.82	0.09
07/30/09 15:05:25	23679	5.55	32.62	0.08
07/30/09 15:05:55	23709	5.55	33.08	0.07
07/30/09 15:06:25	23739	5.64	32.88	0.09
07/30/09 15:06:55	23769	5.70	32.45	0.09
07/30/09 15:07:25	23799	5.67	31.78	0.09
07/30/09 15:07:55	23829	5.64	31.85	0.09
07/30/09 15:08:25	23859	5.61	32.07	0.08
07/30/09 15:08:55	23889	5.63	32.58	0.10
07/30/09 15:09:25	23919	5.66	32.27	0.08
07/30/09 15:09:55	23949	5.61	32.12	0.10
07/30/09 15:10:25	23979	5.63	32.95	0.10
07/30/09 15:10:55	24009	5.71	33.17	0.04
07/30/09 15:11:25	24039	5.67	32.10	0.09

**Florida Power and Light**  
**July 30, 2009**  
**Babcock and Wilcox, Permit ID Number #009**  
**West County Energy Center**

**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,932	SCFH

**Weather Data**

Barometric Pressure	30.21	in. Hg
Relative Humidity	70	%
Ambient Temperature	86	°F
Specific Humidity	0.018611	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	91	MMBtu/hr
Steam Rate	59,714	Steam lb/hr
Stack Exhaust Flow (M19)	1,072,275	SCFH

Full Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NOx (ppmvd)	CO (ppmvd)
07/30/09 15:11:55	24069	5.68	31.94	0.03
07/30/09 15:12:25	24099	5.69	31.89	0.06
07/30/09 15:12:55	24129	5.70	32.03	0.05
07/30/09 15:13:25	24159	5.68	31.90	0.06
07/30/09 15:13:55	24189	5.69	32.32	0.10
07/30/09 15:14:25	24219	5.67	32.56	0.06
07/30/09 15:14:55	24249	5.68	32.04	0.07
07/30/09 15:15:25	24279	5.67	32.07	0.10
07/30/09 15:15:55	24309	5.67	31.87	0.07
07/30/09 15:16:25	24339	5.66	32.03	0.05
07/30/09 15:16:55	24369	5.64	31.94	0.09
07/30/09 15:17:25	24399	5.64	32.21	0.08
07/30/09 15:17:55	24429	5.62	33.47	0.05
07/30/09 15:18:25	24459	5.62	32.99	0.05
07/30/09 15:18:55	24489	5.65	32.15	0.03
07/30/09 15:19:25	24519	5.63	32.04	0.07
07/30/09 15:19:55	24549	5.61	32.04	0.09
07/30/09 15:20:25	24579	5.62	32.45	0.08
07/30/09 15:20:55	24609	5.63	32.37	0.08
07/30/09 15:21:25	24639	5.60	31.78	0.06
07/30/09 15:21:55	24669	5.61	32.05	0.07
07/30/09 15:22:25	24699	5.59	32.42	0.08
07/30/09 15:22:55	24729	5.60	32.68	0.07
07/30/09 15:23:25	24759	5.64	32.27	0.06
07/30/09 15:23:55	24789	5.63	32.28	0.00
07/30/09 15:24:25	24819	5.63	32.40	0.01
07/30/09 15:24:55	24849	5.66	32.31	0.06
07/30/09 15:25:25	24879	5.66	32.10	0.02
07/30/09 15:25:55	24909	5.65	32.13	0.06
07/30/09 15:26:25	24939	5.64	32.04	0.04
07/30/09 15:26:55	24969	5.59	31.94	0.07
07/30/09 15:27:25	24999	5.61	32.65	0.06
07/30/09 15:27:55	25029	5.59	32.32	0.07
07/30/09 15:28:25	25059	5.59	32.15	0.07
07/30/09 15:28:55	25089	5.62	32.40	0.00
07/30/09 15:29:25	25119	5.59	32.56	0.09
07/30/09 15:29:55	25149	5.54	32.20	0.10
07/30/09 15:30:25	25179	5.60	32.47	0.07
07/30/09 15:30:55	25209	5.59	32.25	0.07
07/30/09 15:31:25	25239	5.56	32.32	0.07
07/30/09 15:31:55	25269	5.56	32.08	0.01
07/30/09 15:32:25	25299	5.58	32.35	0.09
07/30/09 15:32:55	25329	5.57	32.12	0.11
07/30/09 15:33:25	25359	5.61	32.17	0.05
07/30/09 15:33:55	25389	5.63	32.93	0.05
07/30/09 15:34:25	25419	5.62	32.25	0.05
07/30/09 15:34:55	25449	5.63	32.08	0.09
07/30/09 15:35:25	25479	5.64	31.91	0.07
07/30/09 15:35:55	25509	5.64	32.32	0.07
07/30/09 15:36:25	25539	5.60	32.17	0.07
07/30/09 15:36:55	25569	5.57	32.30	0.03
07/30/09 15:37:25	25599	5.53	32.12	0.07
07/30/09 15:37:55	25629	5.60	32.84	0.08

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Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,932	SCFH

Weather Data

Barometric Pressure	30.21	in. Hg
Relative Humidity	70	%
Ambient Temperature	86	°F
Specific Humidity	0.018611	lb H <sub>2</sub> O / lb air

Permit ID Number Data

Heat Input	91	MMBtu/hr
Steam Rate	59,714	Steam lb/hr
Stack Exhaust Flow (M19)	1,072,275	SCFH

Full Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
07/30/09 15:38:25	25659	5.61	32.07	0.02
07/30/09 15:38:55	25689	5.49	31.96	0.09
07/30/09 15:39:25	25719	5.53	32.59	0.07
07/30/09 15:39:55	25749	5.57	32.41	0.06
07/30/09 15:40:25	25779	5.54	32.15	0.10
07/30/09 15:40:55	25809	5.57	32.28	0.04
07/30/09 15:41:25	25839	5.57	32.09	0.09
07/30/09 15:41:55	25869	5.57	32.17	0.05
07/30/09 15:42:25	25899	5.56	32.09	0.01
07/30/09 15:42:55	25929	5.59	32.17	0.10
07/30/09 15:43:25	25959	5.59	31.74	0.04
07/30/09 15:43:55	25989	5.54	31.98	0.09
07/30/09 15:44:25	26019	5.54	32.64	0.07
07/30/09 15:44:55	26049	5.53	32.54	0.08

**RAW AVERAGE**    **5.62**            **32.27**            **0.07**

	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
Serial Number: INST-22-0001 INST-NX-0010 INST-CO-0008			
<b>Initial Zero</b>	0.02	0.38	-0.18
<b>Final Zero</b>	0.01	0.38	-0.24
<b>Avg. Zero</b>	0.02	0.38	-0.21
<b>Initial UpScale</b>	6.01	27.75	31.02
<b>Final UpScale</b>	6.01	27.61	30.81
<b>Avg. UpScale</b>	6.01	27.68	30.92

Bias

Upscale Cal Gas    6.03            28.70            30.70

<b>EMISSIONS DATA</b>	O <sub>2</sub>	NO <sub>x</sub>	CO
Corrected Raw Average (ppm/% dry basis)	5.63	33.52	0.28
Concentration (ppm@ 3%O <sub>2</sub> )	N/A	39.31	0.33
Emission Rate (lb/MMBtu)	N/A	0.047	0.000

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**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,434	SCFH

**Weather Data**

Barometric Pressure	29.88	in. Hg
Relative Humidity	69	%
Ambient Temperature	87	° F
Specific Humidity	0.019164	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	90	MMBtu/hr
Steam Rate	60,017	Steam lb/hr
Stack Exhaust Flow (M19)	1,057,563	SCFH

Full Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NOx (ppmvd)	CO (ppmvd)
07/30/09 15:54:25	26619	5.50	31.60	0.04
07/30/09 15:54:55	26649	5.50	31.51	0.16
07/30/09 15:55:25	26679	5.48	31.39	0.09
07/30/09 15:55:55	26709	5.49	31.44	0.10
07/30/09 15:56:25	26739	5.53	31.38	0.07
07/30/09 15:56:55	26769	5.52	31.28	0.07
07/30/09 15:57:25	26799	5.52	31.44	0.07
07/30/09 15:57:55	26829	5.47	32.09	0.08
07/30/09 15:58:25	26859	5.49	32.02	0.08
07/30/09 15:58:55	26889	5.50	31.98	0.07
07/30/09 15:59:25	26919	5.54	32.56	0.04
07/30/09 15:59:55	26949	5.50	32.31	0.09
07/30/09 16:00:25	26979	5.52	32.21	0.05
07/30/09 16:00:55	27009	5.57	32.14	0.02
07/30/09 16:01:25	27039	5.52	31.49	0.07
07/30/09 16:01:55	27069	5.57	32.14	0.09
07/30/09 16:02:25	27099	5.57	32.02	0.08
07/30/09 16:02:55	27129	5.54	32.02	0.03
07/30/09 16:03:25	27159	5.50	31.97	0.03
07/30/09 16:03:55	27189	5.51	31.96	0.06
07/30/09 16:04:25	27219	5.52	31.90	0.03
07/30/09 16:04:55	27249	5.49	31.97	0.10
07/30/09 16:05:25	27279	5.48	32.37	0.05
07/30/09 16:05:55	27309	5.54	32.60	0.06
07/30/09 16:06:25	27339	5.52	32.31	0.06
07/30/09 16:06:55	27369	5.50	31.79	0.07
07/30/09 16:07:25	27399	5.44	31.50	0.07
07/30/09 16:07:55	27429	5.43	31.49	0.06
07/30/09 16:08:25	27459	5.41	32.10	0.11
07/30/09 16:08:55	27489	5.39	32.23	0.07
07/30/09 16:09:25	27519	5.44	32.65	0.06
07/30/09 16:09:55	27549	5.48	32.37	0.11
07/30/09 16:10:25	27579	5.45	31.50	0.01
07/30/09 16:10:55	27609	5.47	32.05	0.11
07/30/09 16:11:25	27639	5.43	31.99	0.10
07/30/09 16:11:55	27669	5.44	32.01	0.07
07/30/09 16:12:25	27699	5.41	31.91	0.07
07/30/09 16:12:55	27729	5.41	31.61	0.09
07/30/09 16:13:25	27759	5.43	32.29	0.12
07/30/09 16:13:55	27789	5.45	32.55	0.09
07/30/09 16:14:25	27819	5.42	32.22	0.07
07/30/09 16:14:55	27849	5.44	31.89	0.06
07/30/09 16:15:25	27879	5.43	32.23	0.07
07/30/09 16:15:55	27909	5.47	31.52	0.09
07/30/09 16:16:25	27939	5.45	31.34	0.07
07/30/09 16:16:55	27969	5.46	31.58	0.06
07/30/09 16:17:25	27999	5.47	31.70	0.08
07/30/09 16:17:55	28029	5.46	31.30	0.09
07/30/09 16:18:25	28059	5.46	31.41	0.11
07/30/09 16:18:55	28089	5.47	31.89	0.06
07/30/09 16:19:25	28119	5.47	31.68	0.06
07/30/09 16:19:55	28149	5.51	31.69	0.07
07/30/09 16:20:25	28179	5.48	31.22	0.07

**Florida Power and Light**  
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**West County Energy Center**

**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,434	SCFH

**Weather Data**

Barometric Pressure	29.88	in. Hg
Relative Humidity	69	%
Ambient Temperature	87	°F
Specific Humidity	0.019164	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	90	MMBtu/hr
Steam Rate	60,017	Steam lb/hr
Stack Exhaust Flow (M19)	1,057,563	SCFH

Full Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
07/30/09 16:20:55	28209	5.43	31.56	0.06
07/30/09 16:21:25	28239	5.47	32.00	0.06
07/30/09 16:21:55	28269	5.50	31.58	0.05
07/30/09 16:22:25	28299	5.51	31.52	0.11
07/30/09 16:22:55	28329	5.49	31.66	0.09
07/30/09 16:23:25	28359	5.49	31.79	0.09
07/30/09 16:23:55	28389	5.54	32.42	0.05
07/30/09 16:24:25	28419	5.52	32.28	0.11
07/30/09 16:24:55	28449	5.51	32.21	0.08
07/30/09 16:25:25	28479	5.51	32.12	0.10
07/30/09 16:25:55	28509	5.52	32.24	0.10
07/30/09 16:26:25	28539	5.54	31.70	0.05
07/30/09 16:26:55	28569	5.56	31.60	0.10
07/30/09 16:27:25	28599	5.54	31.52	0.06
07/30/09 16:27:55	28629	5.49	31.94	0.03
07/30/09 16:28:25	28659	5.48	32.39	0.08
07/30/09 16:28:55	28689	5.52	32.01	0.11
07/30/09 16:29:25	28719	5.47	31.88	0.07
07/30/09 16:29:55	28749	5.50	31.79	0.07
07/30/09 16:30:25	28779	5.48	32.01	0.07
07/30/09 16:30:55	28809	5.47	31.72	0.07
07/30/09 16:31:25	28839	5.48	32.29	0.05
07/30/09 16:31:55	28869	5.43	32.25	0.07
07/30/09 16:32:25	28899	5.41	32.27	0.11
07/30/09 16:32:55	28929	5.42	32.50	0.12
07/30/09 16:33:25	28959	5.48	32.85	0.11
07/30/09 16:33:55	28989	5.52	32.28	0.12
07/30/09 16:34:25	29019	5.53	32.32	0.05
07/30/09 16:34:55	29049	5.51	32.44	0.08
07/30/09 16:35:25	29079	5.52	32.68	0.09
07/30/09 16:35:55	29109	5.54	32.96	0.05
07/30/09 16:36:25	29139	5.54	33.24	0.08
07/30/09 16:36:55	29169	5.50	32.63	0.09
07/30/09 16:37:25	29199	5.50	32.61	0.13
07/30/09 16:37:55	29229	5.52	32.94	0.09
07/30/09 16:38:25	29259	5.51	33.19	0.08
07/30/09 16:38:55	29289	5.46	33.07	0.07
07/30/09 16:39:25	29319	5.50	33.57	0.12
07/30/09 16:39:55	29349	5.49	32.90	0.09
07/30/09 16:40:25	29379	5.46	33.38	0.09
07/30/09 16:40:55	29409	5.41	33.29	0.11
07/30/09 16:41:25	29439	5.45	34.06	0.14
07/30/09 16:41:55	29469	5.44	33.26	0.11
07/30/09 16:42:25	29499	5.44	32.98	0.10
07/30/09 16:42:55	29529	5.43	33.30	0.10
07/30/09 16:43:25	29559	5.47	33.28	0.08
07/30/09 16:43:55	29589	5.50	33.13	0.08
07/30/09 16:44:25	29619	5.49	33.10	0.10
07/30/09 16:44:55	29649	5.50	33.18	0.09
07/30/09 16:45:25	29679	5.46	33.46	0.09
07/30/09 16:45:55	29709	5.45	33.89	0.18
07/30/09 16:46:25	29739	5.45	33.15	0.09
07/30/09 16:46:55	29769	5.48	33.61	0.06

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**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	90,434	SCFH

**Weather Data**

Barometric Pressure	29.88	in. Hg
Relative Humidity	69	%
Ambient Temperature	87	°F
Specific Humidity	0.019164	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	90	MMBtu/hr
Steam Rate	60,017	Steam lb/hr
Stack Exhaust Flow (M19)	1,057,563	SCFH

Full Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
07/30/09 16:47:25	29799	5.48	33.65	0.09
07/30/09 16:47:55	29829	5.50	33.09	0.06
07/30/09 16:48:25	29859	5.47	33.02	0.12
07/30/09 16:48:55	29889	5.50	33.50	0.10
07/30/09 16:49:25	29919	5.49	33.20	0.06
07/30/09 16:49:55	29949	5.48	32.93	0.09
07/30/09 16:50:25	29979	5.48	33.02	0.09
07/30/09 16:50:55	30009	5.49	32.96	0.09
07/30/09 16:51:25	30039	5.49	33.09	0.09
07/30/09 16:51:55	30069	5.48	33.77	0.09
07/30/09 16:52:25	30099	5.50	33.44	0.08
07/30/09 16:52:55	30129	5.43	32.85	0.05
07/30/09 16:53:25	30159	5.47	33.13	0.10
07/30/09 16:53:55	30189	5.51	32.59	0.10

**RAW AVERAGE**                                      **5.48**        **32.33**        **0.08**

	Serial Number:	O <sub>2</sub>	NO <sub>x</sub>	CO
		(%)	(ppmvd)	(ppmvd)
<b>Bias</b>	INST-22-0001			INST-CO-0008
	INST-NX-0010			
	Initial Zero	0.01	0.38	-0.24
	Final Zero	0.02	0.42	-0.21
	Avg. Zero	0.02	0.40	-0.23
	Initial UpScale	6.01	27.61	30.81
	Final UpScale	6.00	27.61	30.97

**Upscale Cal Gas**                                      **6.03**        **28.70**        **30.70**

<b>EMISSIONS DATA</b>	O <sub>2</sub>	NO <sub>x</sub>	CO
Corrected Raw Average (ppm/% dry basis)	5.51	33.68	0.30
Concentration (ppm@ 3%O <sub>2</sub> )	N/A	39.16	0.35
Emission Rate (lb/MMBtu)	N/A	0.047	0.000

**Florida Power and Light**  
**July 30, 2009**  
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**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	89,769	SCFH

**Weather Data**

Barometric Pressure	29.83	in. Hg
Relative Humidity	69	%
Ambient Temperature	86	°F
Specific Humidity	0.018578	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	89	MMBtu/hr
Steam Rate	59,307	Steam lb/hr
Stack Exhaust Flow (M19)	1,059,417	SCFH

Full Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NO <sub>x</sub> (ppmvd)	CO (ppmvd)
07/30/09 17:02:25	30699	5.56	31.74	0.12
07/30/09 17:02:55	30729	5.55	32.05	0.11
07/30/09 17:03:25	30759	5.49	31.99	0.09
07/30/09 17:03:55	30789	5.58	31.84	0.11
07/30/09 17:04:25	30819	5.55	31.80	0.07
07/30/09 17:04:55	30849	5.56	32.08	0.10
07/30/09 17:05:25	30879	5.61	32.12	0.10
07/30/09 17:05:55	30909	5.61	31.84	0.09
07/30/09 17:06:25	30939	5.59	32.04	0.10
07/30/09 17:06:55	30969	5.60	32.23	0.08
07/30/09 17:07:25	30999	5.60	31.97	0.08
07/30/09 17:07:55	31029	5.55	31.84	0.08
07/30/09 17:08:25	31059	5.54	32.06	0.11
07/30/09 17:08:55	31089	5.53	32.36	0.09
07/30/09 17:09:25	31119	5.59	32.88	0.09
07/30/09 17:09:55	31149	5.56	32.11	0.06
07/30/09 17:10:25	31179	5.55	31.58	0.05
07/30/09 17:10:55	31209	5.55	31.89	0.06
07/30/09 17:11:25	31239	5.54	31.85	0.06
07/30/09 17:11:55	31269	5.58	31.81	0.09
07/30/09 17:12:25	31299	5.56	31.61	0.10
07/30/09 17:12:55	31329	5.57	32.10	0.08
07/30/09 17:13:25	31359	5.62	31.76	0.07
07/30/09 17:13:55	31389	5.63	31.45	0.05
07/30/09 17:14:25	31419	5.62	31.45	0.07
07/30/09 17:14:55	31449	5.63	31.38	0.06
07/30/09 17:15:25	31479	5.59	31.77	0.08
07/30/09 17:15:55	31509	5.62	31.91	0.07
07/30/09 17:16:25	31539	5.64	31.41	0.11
07/30/09 17:16:55	31569	5.61	31.65	0.04
07/30/09 17:17:25	31599	5.63	31.85	0.06
07/30/09 17:17:55	31629	5.63	31.60	0.09
07/30/09 17:18:25	31659	5.61	31.66	0.05
07/30/09 17:18:55	31689	5.62	32.03	0.07
07/30/09 17:19:25	31719	5.68	31.40	0.05
07/30/09 17:19:55	31749	5.68	31.54	0.07
07/30/09 17:20:25	31779	5.61	32.35	0.09
07/30/09 17:20:55	31809	5.62	32.26	0.04
07/30/09 17:21:25	31839	5.63	31.48	0.02
07/30/09 17:21:55	31869	5.59	31.20	0.08
07/30/09 17:22:25	31899	5.62	31.93	0.08
07/30/09 17:22:55	31929	5.62	31.27	0.10
07/30/09 17:23:25	31959	5.64	31.57	0.10
07/30/09 17:23:55	31989	5.67	31.38	0.08
07/30/09 17:24:25	32019	5.62	31.64	0.08
07/30/09 17:24:55	32049	5.65	31.85	0.03
07/30/09 17:25:25	32079	5.66	31.64	0.07
07/30/09 17:25:55	32109	5.64	31.38	0.09
07/30/09 17:26:25	32139	5.66	31.31	0.08
07/30/09 17:26:55	32169	5.64	31.82	0.12
07/30/09 17:27:25	32199	5.67	31.45	0.07
07/30/09 17:27:55	32229	5.66	31.71	0.05
07/30/09 17:28:25	32259	5.65	31.40	0.07



**Florida Power and Light**  
**July 30, 2009**  
**Babcock and Wilcox, Permit ID Number #009**  
**West County Energy Center**

**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	89,769	SCFH

**Weather Data**

Barometric Pressure	29.83	in. Hg
Relative Humidity	69	%
Ambient Temperature	86	°F
Specific Humidity	0.018578	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	89	MMBtu/hr
Steam Rate	59,307	Steam lb/hr
Stack Exhaust Flow (M19)	1,059,417	SCFH

Full Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NOx (ppmvd)	CO (ppmvd)
07/30/09 17:28:55	32289	5.64	31.32	0.08
07/30/09 17:29:25	32319	5.62	31.53	0.02
07/30/09 17:29:55	32349	5.66	31.53	0.09
07/30/09 17:30:25	32379	5.62	31.13	0.08
07/30/09 17:30:55	32409	5.61	31.47	0.04
07/30/09 17:31:25	32439	5.63	31.60	0.06
07/30/09 17:31:55	32469	5.67	31.29	0.04
07/30/09 17:32:25	32499	5.67	31.00	0.10
07/30/09 17:32:55	32529	5.66	31.24	0.07
07/30/09 17:33:25	32559	5.66	30.94	0.08
07/30/09 17:33:55	32589	5.67	30.89	0.07
07/30/09 17:34:25	32619	5.58	31.55	0.08
07/30/09 17:34:55	32649	5.58	31.65	0.08
07/30/09 17:35:25	32679	5.54	31.29	0.10
07/30/09 17:35:55	32709	5.54	32.10	0.08
07/30/09 17:36:25	32739	5.65	32.50	0.08
07/30/09 17:36:55	32769	5.65	31.54	0.04
07/30/09 17:37:25	32799	5.63	31.40	0.08
07/30/09 17:37:55	32829	5.63	31.34	0.05
07/30/09 17:38:25	32859	5.62	31.32	0.08
07/30/09 17:38:55	32889	5.68	31.14	0.05
07/30/09 17:39:25	32919	5.66	31.22	0.08
07/30/09 17:39:55	32949	5.55	31.23	0.08
07/30/09 17:40:25	32979	5.57	31.84	0.08
07/30/09 17:40:55	33009	5.57	31.13	0.10
07/30/09 17:41:25	33039	5.62	31.24	0.10
07/30/09 17:41:55	33069	5.62	31.74	0.09
07/30/09 17:42:25	33099	5.66	31.40	0.05
07/30/09 17:42:55	33129	5.69	30.95	0.09
07/30/09 17:43:25	33159	5.61	31.05	0.04
07/30/09 17:43:55	33189	5.61	31.45	0.09
07/30/09 17:44:25	33219	5.62	31.30	0.06
07/30/09 17:44:55	33249	5.66	32.00	0.04
07/30/09 17:45:25	33279	5.64	31.36	0.11
07/30/09 17:45:55	33309	5.66	31.53	0.10
07/30/09 17:46:25	33339	5.69	31.11	0.05
07/30/09 17:46:55	33369	5.66	31.23	0.10
07/30/09 17:47:25	33399	5.67	31.38	0.08
07/30/09 17:47:55	33429	5.63	30.99	0.05
07/30/09 17:48:25	33459	5.62	31.16	0.07
07/30/09 17:48:55	33489	5.55	31.25	0.10
07/30/09 17:49:25	33519	5.61	31.63	0.11
07/30/09 17:49:55	33549	5.67	31.56	0.06
07/30/09 17:50:25	33579	5.66	31.41	0.07
07/30/09 17:50:55	33609	5.61	31.47	0.06
07/30/09 17:51:25	33639	5.53	31.38	0.07
07/30/09 17:51:55	33669	5.54	31.72	0.08
07/30/09 17:52:25	33699	5.61	32.00	0.12
07/30/09 17:52:55	33729	5.68	31.94	0.08
07/30/09 17:53:25	33759	5.68	31.20	0.09
07/30/09 17:53:55	33789	5.64	31.42	0.09
07/30/09 17:54:25	33819	5.60	31.91	0.10
07/30/09 17:54:55	33849	5.61	31.96	0.08

**Florida Power and Light  
July 30, 2009  
Babcock and Wilcox, Permit ID Number #009  
West County Energy Center**

**Fuel Data**

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	997	Btu/SCF fuel
Aux Boiler Fuel Flow	89,769	SCFH

**Weather Data**

Barometric Pressure	29.83	in. Hg
Relative Humidity	69	%
Ambient Temperature	86	°F
Specific Humidity	0.018578	lb H <sub>2</sub> O / lb air

**Permit ID Number Data**

Heat Input	89	MMBtu/hr
Steam Rate	59,307	Steam lb/hr
Stack Exhaust Flow (M19)	1,059,417	SCFH

Full Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O <sub>2</sub> (%)	NOx (ppmvd)	CO (ppmvd)
07/30/09 17:55:25	33879	5.58	31.67	0.12
07/30/09 17:55:55	33909	5.57	31.78	0.13
07/30/09 17:56:25	33939	5.57	31.81	0.11
07/30/09 17:56:55	33969	5.59	31.85	0.10
07/30/09 17:57:25	33999	5.56	31.61	0.09
07/30/09 17:57:55	34029	5.57	31.80	0.08
07/30/09 17:58:25	34059	5.57	32.16	0.09
07/30/09 17:58:55	34089	5.60	31.47	0.08
07/30/09 17:59:25	34119	5.59	31.17	0.06
07/30/09 17:59:55	34149	5.59	31.60	0.10
07/30/09 18:00:25	34179	5.65	31.23	0.12
07/30/09 18:00:55	34209	5.61	31.25	0.10
07/30/09 18:01:25	34239	5.62	31.76	0.08
07/30/09 18:01:55	34269	5.63	31.37	0.09

**RAW AVERAGE O<sub>2</sub> 5.61 NOx 31.61 CO 0.08**

	O <sub>2</sub>	NOx	CO
	(%)	(ppmvd)	(ppmvd)
Serial Number: INST-22-0001 INST-NX-0010 INST-CO-0008			
Initial Zero	0.02	0.42	-0.21
Final Zero	0.01	0.49	-0.22
Avg. Zero	0.02	0.46	-0.22
<b>Bias</b>			
Initial UpScale	6.00	27.61	30.97
Final UpScale	5.99	27.70	30.91
Avg. UpScale	6.00	27.66	30.94
<b>Upscale Cal Gas</b>	6.03	28.70	30.70

EMISSIONS DATA	O <sub>2</sub>	NOx	CO
Corrected Raw Average (ppm/% dry basis)	5.65	32.87	0.29
Concentration (ppm@ 3%O <sub>2</sub> )	N/A	38.57	0.34
Emission Rate (lb/MMBtu)	N/A	0.046	0.000

**TEST RESULTS AND CALCULATIONS**

**Opacity Data**

**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

Run 1

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.
0.00	0	N/A	15.00	0	0.00	30.00	0	0.00	45.00	0	0.00
0.25	0	N/A	15.25	0	0.00	30.25	0	0.00	45.25	0	0.00
0.50	0	N/A	15.50	0	0.00	30.50	0	0.00	45.50	0	0.00
0.75	0	N/A	15.75	0	0.00	30.75	0	0.00	45.75	0	0.00
1.00	0	N/A	16.00	0	0.00	31.00	0	0.00	46.00	0	0.00
1.25	0	N/A	16.25	0	0.00	31.25	0	0.00	46.25	0	0.00
1.50	0	N/A	16.50	0	0.00	31.50	0	0.00	46.50	0	0.00
1.75	0	N/A	16.75	0	0.00	31.75	0	0.00	46.75	0	0.00
2.00	0	N/A	17.00	0	0.00	32.00	0	0.00	47.00	0	0.00
2.25	0	N/A	17.25	0	0.00	32.25	0	0.00	47.25	0	0.00
2.50	0	N/A	17.50	0	0.00	32.50	0	0.00	47.50	0	0.00
2.75	0	N/A	17.75	0	0.00	32.75	0	0.00	47.75	0	0.00
3.00	0	N/A	18.00	0	0.00	33.00	0	0.00	48.00	0	0.00
3.25	0	N/A	18.25	0	0.00	33.25	0	0.00	48.25	0	0.00
3.50	0	N/A	18.50	0	0.00	33.50	0	0.00	48.50	0	0.00
3.75	0	N/A	18.75	0	0.00	33.75	0	0.00	48.75	0	0.00
4.00	0	N/A	19.00	0	0.00	34.00	0	0.00	49.00	0	0.00
4.25	0	N/A	19.25	0	0.00	34.25	0	0.00	49.25	0	0.00
4.50	0	N/A	19.50	0	0.00	34.50	0	0.00	49.50	0	0.00
4.75	0	N/A	19.75	0	0.00	34.75	0	0.00	49.75	0	0.00
5.00	0	N/A	20.00	0	0.00	35.00	0	0.00	50.00	0	0.00
5.25	0	N/A	20.25	0	0.00	35.25	0	0.00	50.25	0	0.00
5.50	0	N/A	20.50	0	0.00	35.50	0	0.00	50.50	0	0.00
5.75	0	0.00	20.75	0	0.00	35.75	0	0.00	50.75	0	0.00
6.00	0	0.00	21.00	0	0.00	36.00	0	0.00	51.00	0	0.00
6.25	0	0.00	21.25	0	0.00	36.25	0	0.00	51.25	0	0.00
6.50	0	0.00	21.50	0	0.00	36.50	0	0.00	51.50	0	0.00
6.75	0	0.00	21.75	0	0.00	36.75	0	0.00	51.75	0	0.00
7.00	0	0.00	22.00	0	0.00	37.00	0	0.00	52.00	0	0.00
7.25	0	0.00	22.25	0	0.00	37.25	0	0.00	52.25	0	0.00
7.50	0	0.00	22.50	0	0.00	37.50	0	0.00	52.50	0	0.00
7.75	0	0.00	22.75	0	0.00	37.75	0	0.00	52.75	0	0.00
8.00	0	0.00	23.00	0	0.00	38.00	0	0.00	53.00	0	0.00
8.25	0	0.00	23.25	0	0.00	38.25	0	0.00	53.25	0	0.00
8.50	0	0.00	23.50	0	0.00	38.50	0	0.00	53.50	0	0.00
8.75	0	0.00	23.75	0	0.00	38.75	0	0.00	53.75	0	0.00
9.00	0	0.00	24.00	0	0.00	39.00	0	0.00	54.00	0	0.00
9.25	0	0.00	24.25	0	0.00	39.25	0	0.00	54.25	0	0.00
9.50	0	0.00	24.50	0	0.00	39.50	0	0.00	54.50	0	0.00
9.75	0	0.00	24.75	0	0.00	39.75	0	0.00	54.75	0	0.00
10.00	0	0.00	25.00	0	0.00	40.00	0	0.00	55.00	0	0.00
10.25	0	0.00	25.25	0	0.00	40.25	0	0.00	55.25	0	0.00
10.50	0	0.00	25.50	0	0.00	40.50	0	0.00	55.50	0	0.00
10.75	0	0.00	25.75	0	0.00	40.75	0	0.00	55.75	0	0.00
11.00	0	0.00	26.00	0	0.00	41.00	0	0.00	56.00	0	0.00
11.25	0	0.00	26.25	0	0.00	41.25	0	0.00	56.25	0	0.00
11.50	0	0.00	26.50	0	0.00	41.50	0	0.00	56.50	0	0.00
11.75	0	0.00	26.75	0	0.00	41.75	0	0.00	56.75	0	0.00
12.00	0	0.00	27.00	0	0.00	42.00	0	0.00	57.00	0	0.00
12.25	0	0.00	27.25	0	0.00	42.25	0	0.00	57.25	0	0.00
12.50	0	0.00	27.50	0	0.00	42.50	0	0.00	57.50	0	0.00
12.75	0	0.00	27.75	0	0.00	42.75	0	0.00	57.75	0	0.00
13.00	0	0.00	28.00	0	0.00	43.00	0	0.00	58.00	0	0.00
13.25	0	0.00	28.25	0	0.00	43.25	0	0.00	58.25	0	0.00
13.50	0	0.00	28.50	0	0.00	43.50	0	0.00	58.50	0	0.00
13.75	0	0.00	28.75	0	0.00	43.75	0	0.00	58.75	0	0.00
14.00	0	0.00	29.00	0	0.00	44.00	0	0.00	59.00	0	0.00
14.25	0	0.00	29.25	0	0.00	44.25	0	0.00	59.25	0	0.00
14.50	0	0.00	29.50	0	0.00	44.50	0	0.00	59.50	0	0.00
14.75	0	0.00	29.75	0	0.00	44.75	0	0.00	59.75	0	0.00

**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

Run 2

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.
0.00	0	N/A	15.00	0	0.00	30.00	0	0.00	45.00	0	0.00
0.25	0	N/A	15.25	0	0.00	30.25	0	0.00	45.25	0	0.00
0.50	0	N/A	15.50	0	0.00	30.50	0	0.00	45.50	0	0.00
0.75	0	N/A	15.75	0	0.00	30.75	0	0.00	45.75	0	0.00
1.00	0	N/A	16.00	0	0.00	31.00	0	0.00	46.00	0	0.00
1.25	0	N/A	16.25	0	0.00	31.25	0	0.00	46.25	0	0.00
1.50	0	N/A	16.50	0	0.00	31.50	0	0.00	46.50	0	0.00
1.75	0	N/A	16.75	0	0.00	31.75	0	0.00	46.75	0	0.00
2.00	0	N/A	17.00	0	0.00	32.00	0	0.00	47.00	0	0.00
2.25	0	N/A	17.25	0	0.00	32.25	0	0.00	47.25	0	0.00
2.50	0	N/A	17.50	0	0.00	32.50	0	0.00	47.50	0	0.00
2.75	0	N/A	17.75	0	0.00	32.75	0	0.00	47.75	0	0.00
3.00	0	N/A	18.00	0	0.00	33.00	0	0.00	48.00	0	0.00
3.25	0	N/A	18.25	0	0.00	33.25	0	0.00	48.25	0	0.00
3.50	0	N/A	18.50	0	0.00	33.50	0	0.00	48.50	0	0.00
3.75	0	N/A	18.75	0	0.00	33.75	0	0.00	48.75	0	0.00
4.00	0	N/A	19.00	0	0.00	34.00	0	0.00	49.00	0	0.00
4.25	0	N/A	19.25	0	0.00	34.25	0	0.00	49.25	0	0.00
4.50	0	N/A	19.50	0	0.00	34.50	0	0.00	49.50	0	0.00
4.75	0	N/A	19.75	0	0.00	34.75	0	0.00	49.75	0	0.00
5.00	0	N/A	20.00	0	0.00	35.00	0	0.00	50.00	0	0.00
5.25	0	N/A	20.25	0	0.00	35.25	0	0.00	50.25	0	0.00
5.50	0	N/A	20.50	0	0.00	35.50	0	0.00	50.50	0	0.00
5.75	0	0.00	20.75	0	0.00	35.75	0	0.00	50.75	0	0.00
6.00	0	0.00	21.00	0	0.00	36.00	0	0.00	51.00	0	0.00
6.25	0	0.00	21.25	0	0.00	36.25	0	0.00	51.25	0	0.00
6.50	0	0.00	21.50	0	0.00	36.50	0	0.00	51.50	0	0.00
6.75	0	0.00	21.75	0	0.00	36.75	0	0.00	51.75	0	0.00
7.00	0	0.00	22.00	0	0.00	37.00	0	0.00	52.00	0	0.00
7.25	0	0.00	22.25	0	0.00	37.25	0	0.00	52.25	0	0.00
7.50	0	0.00	22.50	0	0.00	37.50	0	0.00	52.50	0	0.00
7.75	0	0.00	22.75	0	0.00	37.75	0	0.00	52.75	0	0.00
8.00	0	0.00	23.00	0	0.00	38.00	0	0.00	53.00	0	0.00
8.25	0	0.00	23.25	0	0.00	38.25	0	0.00	53.25	0	0.00
8.50	0	0.00	23.50	0	0.00	38.50	0	0.00	53.50	0	0.00
8.75	0	0.00	23.75	0	0.00	38.75	0	0.00	53.75	0	0.00
9.00	0	0.00	24.00	0	0.00	39.00	0	0.00	54.00	0	0.00
9.25	0	0.00	24.25	0	0.00	39.25	0	0.00	54.25	0	0.00
9.50	0	0.00	24.50	0	0.00	39.50	0	0.00	54.50	0	0.00
9.75	0	0.00	24.75	0	0.00	39.75	0	0.00	54.75	0	0.00
10.00	0	0.00	25.00	0	0.00	40.00	0	0.00	55.00	0	0.00
10.25	0	0.00	25.25	0	0.00	40.25	0	0.00	55.25	0	0.00
10.50	0	0.00	25.50	0	0.00	40.50	0	0.00	55.50	0	0.00
10.75	0	0.00	25.75	0	0.00	40.75	0	0.00	55.75	0	0.00
11.00	0	0.00	26.00	0	0.00	41.00	0	0.00	56.00	0	0.00
11.25	0	0.00	26.25	0	0.00	41.25	0	0.00	56.25	0	0.00
11.50	0	0.00	26.50	0	0.00	41.50	0	0.00	56.50	0	0.00
11.75	0	0.00	26.75	0	0.00	41.75	0	0.00	56.75	0	0.00
12.00	0	0.00	27.00	0	0.00	42.00	0	0.00	57.00	0	0.00
12.25	0	0.00	27.25	0	0.00	42.25	0	0.00	57.25	0	0.00
12.50	0	0.00	27.50	0	0.00	42.50	0	0.00	57.50	0	0.00
12.75	0	0.00	27.75	0	0.00	42.75	0	0.00	57.75	0	0.00
13.00	0	0.00	28.00	0	0.00	43.00	0	0.00	58.00	0	0.00
13.25	0	0.00	28.25	0	0.00	43.25	0	0.00	58.25	0	0.00
13.50	0	0.00	28.50	0	0.00	43.50	0	0.00	58.50	0	0.00
13.75	0	0.00	28.75	0	0.00	43.75	0	0.00	58.75	0	0.00
14.00	0	0.00	29.00	0	0.00	44.00	0	0.00	59.00	0	0.00
14.25	0	0.00	29.25	0	0.00	44.25	0	0.00	59.25	0	0.00
14.50	0	0.00	29.50	0	0.00	44.50	0	0.00	59.50	0	0.00
14.75	0	0.00	29.75	0	0.00	44.75	0	0.00	59.75	0	0.00

**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

Run 3

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

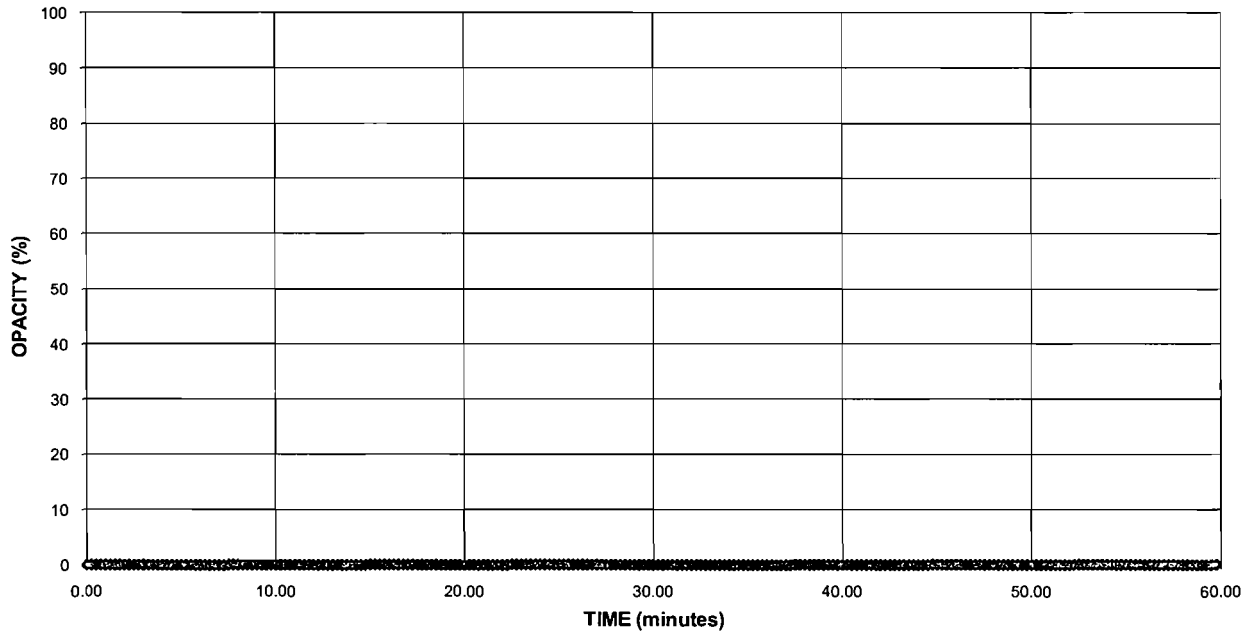
TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.
0.00	0	N/A	15.00	0	0.00	30.00	0	0.00	45.00	0	0.00
0.25	0	N/A	15.25	0	0.00	30.25	0	0.00	45.25	0	0.00
0.50	0	N/A	15.50	0	0.00	30.50	0	0.00	45.50	0	0.00
0.75	0	N/A	15.75	0	0.00	30.75	0	0.00	45.75	0	0.00
1.00	0	N/A	16.00	0	0.00	31.00	0	0.00	46.00	0	0.00
1.25	0	N/A	16.25	0	0.00	31.25	0	0.00	46.25	0	0.00
1.50	0	N/A	16.50	0	0.00	31.50	0	0.00	46.50	0	0.00
1.75	0	N/A	16.75	0	0.00	31.75	0	0.00	46.75	0	0.00
2.00	0	N/A	17.00	0	0.00	32.00	0	0.00	47.00	0	0.00
2.25	0	N/A	17.25	0	0.00	32.25	0	0.00	47.25	0	0.00
2.50	0	N/A	17.50	0	0.00	32.50	0	0.00	47.50	0	0.00
2.75	0	N/A	17.75	0	0.00	32.75	0	0.00	47.75	0	0.00
3.00	0	N/A	18.00	0	0.00	33.00	0	0.00	48.00	0	0.00
3.25	0	N/A	18.25	0	0.00	33.25	0	0.00	48.25	0	0.00
3.50	0	N/A	18.50	0	0.00	33.50	0	0.00	48.50	0	0.00
3.75	0	N/A	18.75	0	0.00	33.75	0	0.00	48.75	0	0.00
4.00	0	N/A	19.00	0	0.00	34.00	0	0.00	49.00	0	0.00
4.25	0	N/A	19.25	0	0.00	34.25	0	0.00	49.25	0	0.00
4.50	0	N/A	19.50	0	0.00	34.50	0	0.00	49.50	0	0.00
4.75	0	N/A	19.75	0	0.00	34.75	0	0.00	49.75	0	0.00
5.00	0	N/A	20.00	0	0.00	35.00	0	0.00	50.00	0	0.00
5.25	0	N/A	20.25	0	0.00	35.25	0	0.00	50.25	0	0.00
5.50	0	N/A	20.50	0	0.00	35.50	0	0.00	50.50	0	0.00
5.75	0	0.00	20.75	0	0.00	35.75	0	0.00	50.75	0	0.00
6.00	0	0.00	21.00	0	0.00	36.00	0	0.00	51.00	0	0.00
6.25	0	0.00	21.25	0	0.00	36.25	0	0.00	51.25	0	0.00
6.50	0	0.00	21.50	0	0.00	36.50	0	0.00	51.50	0	0.00
6.75	0	0.00	21.75	0	0.00	36.75	0	0.00	51.75	0	0.00
7.00	0	0.00	22.00	0	0.00	37.00	0	0.00	52.00	0	0.00
7.25	0	0.00	22.25	0	0.00	37.25	0	0.00	52.25	0	0.00
7.50	0	0.00	22.50	0	0.00	37.50	0	0.00	52.50	0	0.00
7.75	0	0.00	22.75	0	0.00	37.75	0	0.00	52.75	0	0.00
8.00	0	0.00	23.00	0	0.00	38.00	0	0.00	53.00	0	0.00
8.25	0	0.00	23.25	0	0.00	38.25	0	0.00	53.25	0	0.00
8.50	0	0.00	23.50	0	0.00	38.50	0	0.00	53.50	0	0.00
8.75	0	0.00	23.75	0	0.00	38.75	0	0.00	53.75	0	0.00
9.00	0	0.00	24.00	0	0.00	39.00	0	0.00	54.00	0	0.00
9.25	0	0.00	24.25	0	0.00	39.25	0	0.00	54.25	0	0.00
9.50	0	0.00	24.50	0	0.00	39.50	0	0.00	54.50	0	0.00
9.75	0	0.00	24.75	0	0.00	39.75	0	0.00	54.75	0	0.00
10.00	0	0.00	25.00	0	0.00	40.00	0	0.00	55.00	0	0.00
10.25	0	0.00	25.25	0	0.00	40.25	0	0.00	55.25	0	0.00
10.50	0	0.00	25.50	0	0.00	40.50	0	0.00	55.50	0	0.00
10.75	0	0.00	25.75	0	0.00	40.75	0	0.00	55.75	0	0.00
11.00	0	0.00	26.00	0	0.00	41.00	0	0.00	56.00	0	0.00
11.25	0	0.00	26.25	0	0.00	41.25	0	0.00	56.25	0	0.00
11.50	0	0.00	26.50	0	0.00	41.50	0	0.00	56.50	0	0.00
11.75	0	0.00	26.75	0	0.00	41.75	0	0.00	56.75	0	0.00
12.00	0	0.00	27.00	0	0.00	42.00	0	0.00	57.00	0	0.00
12.25	0	0.00	27.25	0	0.00	42.25	0	0.00	57.25	0	0.00
12.50	0	0.00	27.50	0	0.00	42.50	0	0.00	57.50	0	0.00
12.75	0	0.00	27.75	0	0.00	42.75	0	0.00	57.75	0	0.00
13.00	0	0.00	28.00	0	0.00	43.00	0	0.00	58.00	0	0.00
13.25	0	0.00	28.25	0	0.00	43.25	0	0.00	58.25	0	0.00
13.50	0	0.00	28.50	0	0.00	43.50	0	0.00	58.50	0	0.00
13.75	0	0.00	28.75	0	0.00	43.75	0	0.00	58.75	0	0.00
14.00	0	0.00	29.00	0	0.00	44.00	0	0.00	59.00	0	0.00
14.25	0	0.00	29.25	0	0.00	44.25	0	0.00	59.25	0	0.00
14.50	0	0.00	29.50	0	0.00	44.50	0	0.00	59.50	0	0.00
14.75	0	0.00	29.75	0	0.00	44.75	0	0.00	59.75	0	0.00

**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

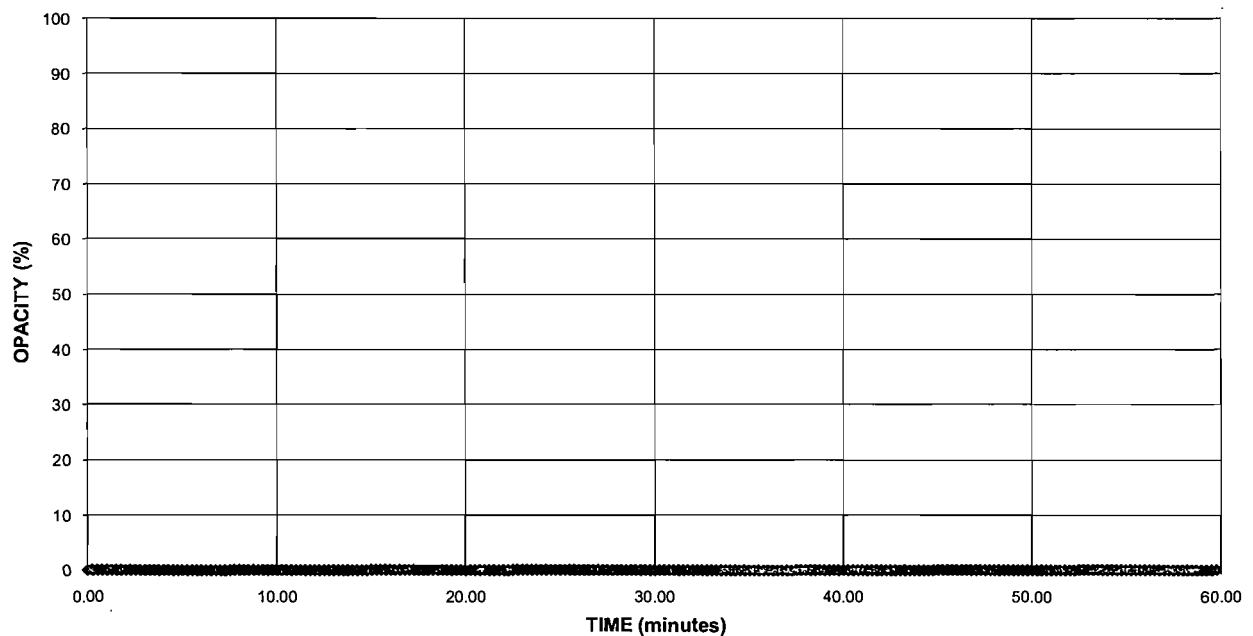
Run 1

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

**OPACITY READINGS  
(15 second intervals)**



**OPACITY RESULTS  
(6 minute averages)**

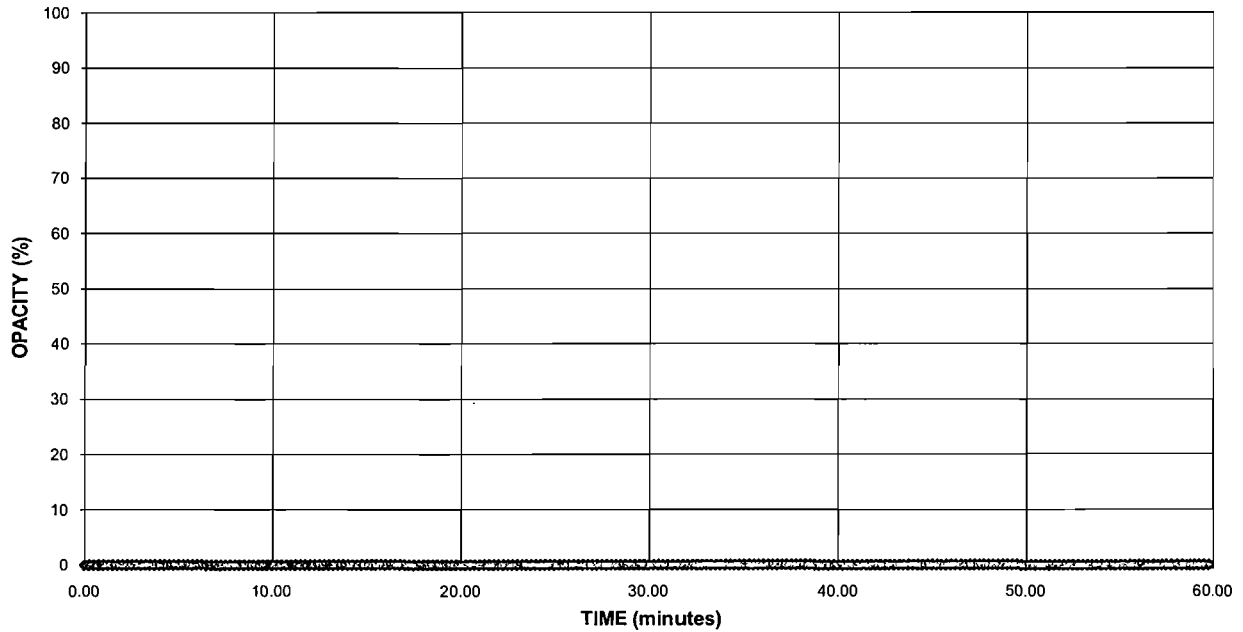


**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

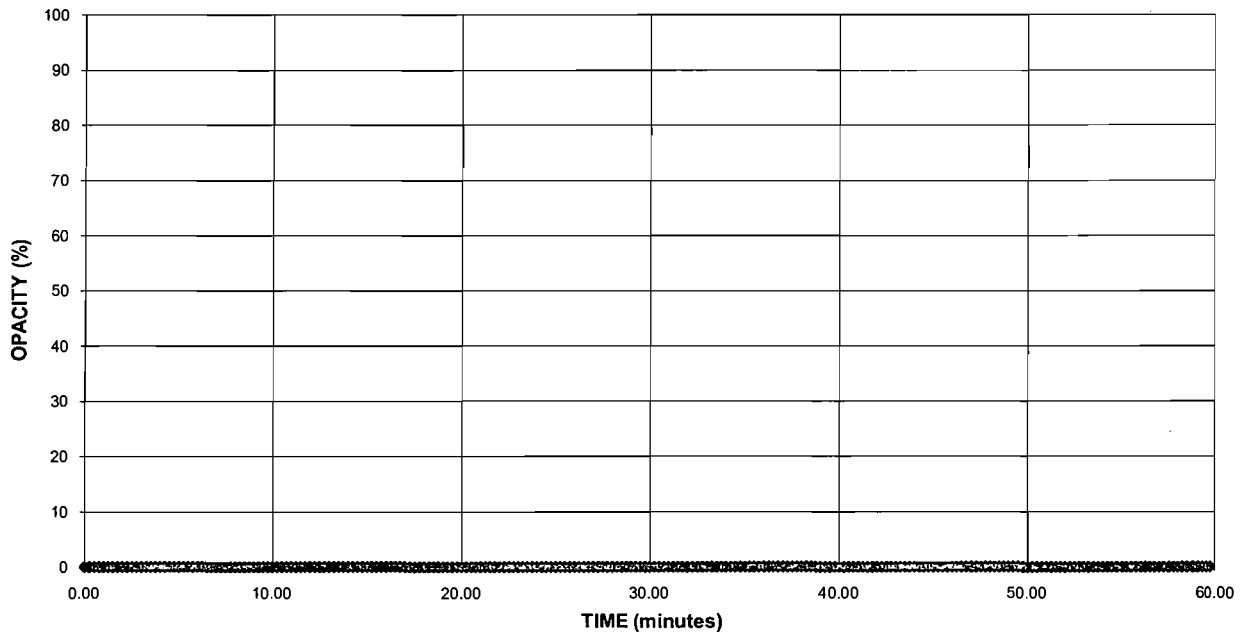
Run 2

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

**OPACITY READINGS  
(15 second intervals)**



**OPACITY RESULTS  
(6 minute averages)**



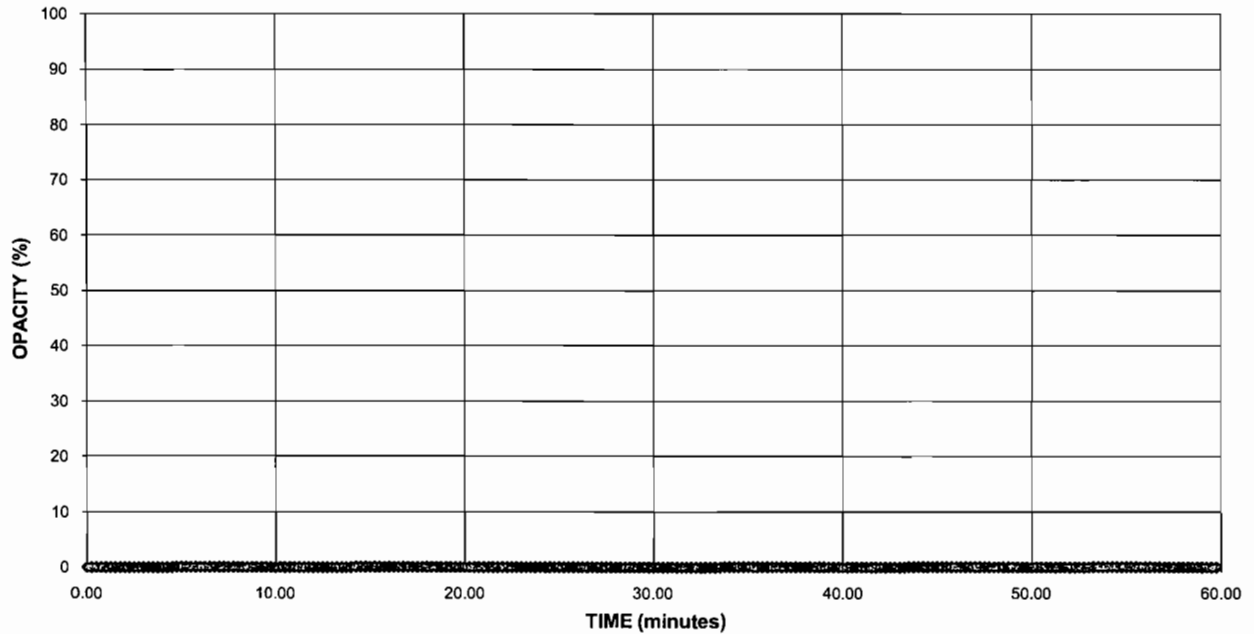


**Company:** Florida Power and Light  
**Equipment:** Babcock and Wilcox  
**Location:** Loxahatchee, Florida  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

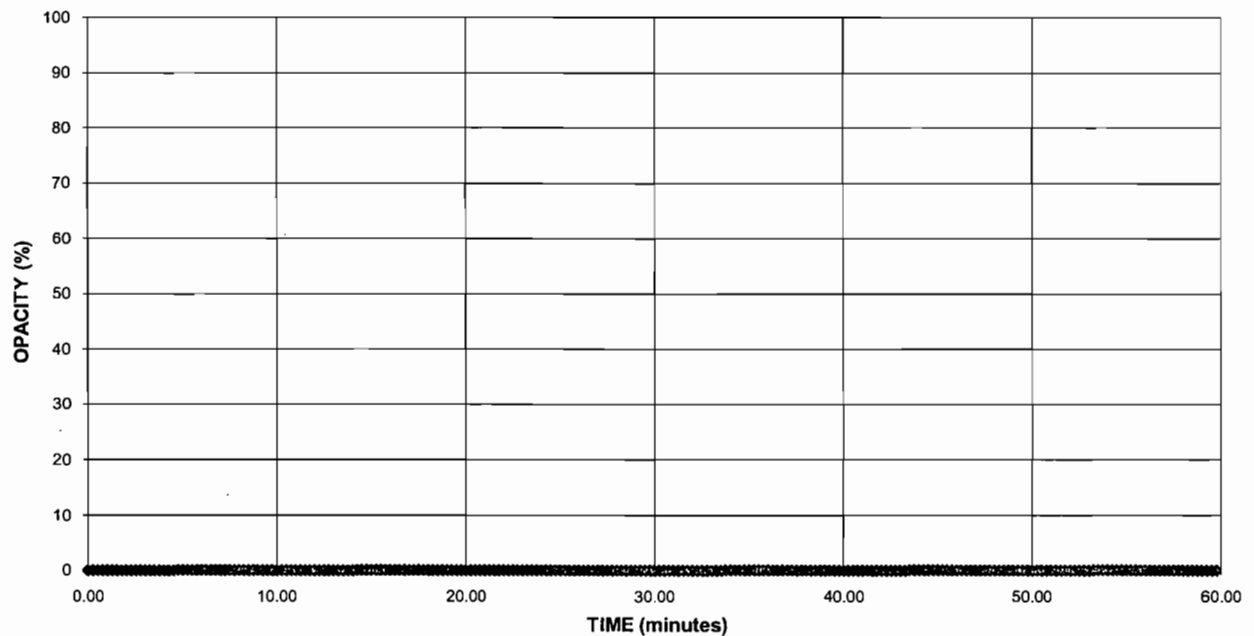
Run 3

**Average Opacity:** 0.00 %  
**Maximum Opacity:** 0 %  
**6 Minute Average:** 0.00 %  
**6 Minute Maximum:** 0.00 %  
**Max Time w/ Opacity:** 0.00 minutes

### OPACITY READINGS (15 second intervals)



### OPACITY RESULTS (6 minute averages)



Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

## VISUAL EMISSIONS OBSERVATION FORM

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Form Number                      Page                      of  
**bv-09-westcounty.fl-comp#1                      1                      6**

Continued on Form Number  
**RUN 1**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Observation Date                      Time Zone                      Start Time                      End Time  
**07/30/09                      EST                      14:45                      15:45**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **-61 ft** End **Same**                      Start **-54'** End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **-80'** End **Same**                      Start **-285°** End **Same**

Min.	Sec.	0	15	30	45	Comments
1		○	○	○	○	
2		○	○	○	○	
3		○	○	○	○	
4		○	○	○	○	
5		○	○	○	○	
6		○	○	○	○	
7		○	○	○	○	
8		○	○	○	○	
9		○	○	○	○	
10		○	○	○	○	
11		○	○	○	○	
12		○	○	○	○	
13		○	○	○	○	
14		○	○	○	○	
15		○	○	○	○	
16		○	○	○	○	
17		○	○	○	○	
18		○	○	○	○	
19		○	○	○	○	
20		○	○	○	○	
21		○	○	○	○	
22		○	○	○	○	
23		○	○	○	○	
24		○	○	○	○	
25		○	○	○	○	
26		○	○	○	○	
27		○	○	○	○	
28		○	○	○	○	
29		○	○	○	○	
30		○	○	○	○	

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **-60°** End **Same**                      Start **-285°** End **Same**

Distance and Direction to Observation Point from Emission Point  
Start **Approx the same** End **Same**

Describe Emissions  
Start **NV** End **NV**

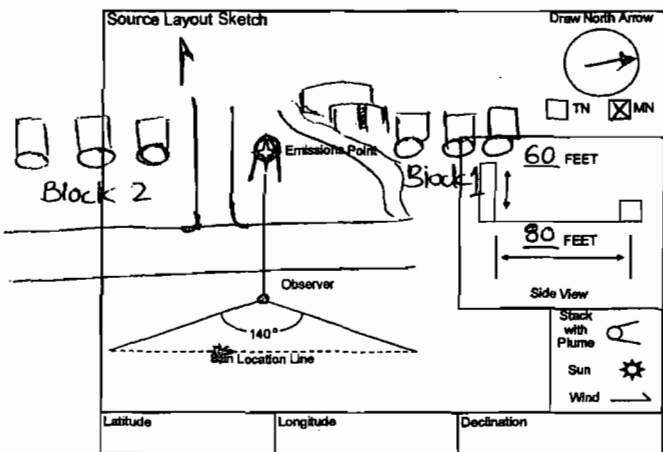
Emission Color                      Water Droplet Plume  
Start **NV** End **Same**                      Start **NV** End **Same**

Describe Plume Background  
Start **Sky** End **Same**

Background Color                      Sky Conditions  
Start **Blue** End **Same**                      Start **Overcast** End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph** End **Same**                      Start **W** End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **84°** End **Same**                      **30.12**                      **70%**



Additional Information

Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Ahtesham*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **~61 ft** End **Same**                      Start **~54'** End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **~80'** End **Same**                      Start **~285°** End **Same**

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **~60°** End **Same**                      Start **~285°** End **Same**

Distance and Direction to Observation Point from Emission Point  
Start **Approx the same** End **Same**

Describe Emissions  
Start **NV** End **NV**

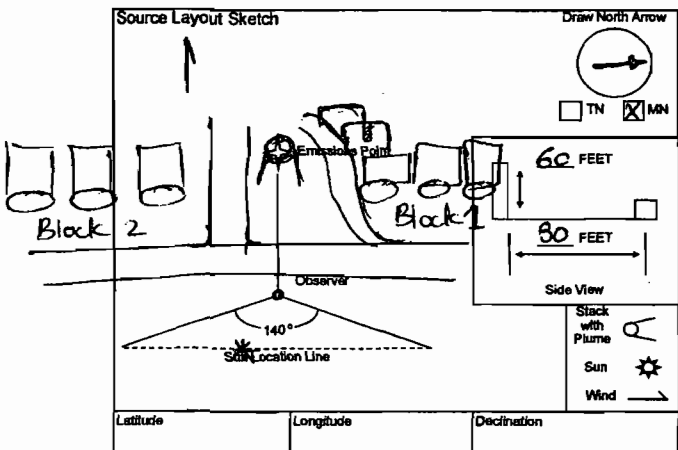
Emission Color                      Water Droplet Plume  
Start **NV** End **Same**                      Start **NV** End **Same**

Describe Plume Background  
Start **Sky** End **Same**

Background Color                      Sky Conditions  
Start **Blue** End **Same**                      Start **Overcast** End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph** End **Same**                      Start **W** End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **84°** End **Same**                      **30.12**                      **70%**



Additional Information

### VISUAL EMISSIONS OBSERVATION FORM

Form Number                      Page                      of  
**bv-09-westcounty.fl-comp#1**                      2                      6

Continued on Form Number                      RUN 1

Min.	Sec.	0	15	30	45	End Time
						15:45
						Comments
1		○	○	○	○	
2		○	○	○	○	
3		○	○	○	○	
4		○	○	○	○	
5		○	○	○	○	
6		○	○	○	○	
7		○	○	○	○	
8		○	○	○	○	
9		○	○	○	○	
10		○	○	○	○	
11		○	○	○	○	
12		○	○	○	○	
13		○	○	○	○	
14		○	○	○	○	
15		○	○	○	○	
16		○	○	○	○	
17		○	○	○	○	
18		○	○	○	○	
19		○	○	○	○	
20		○	○	○	○	
21		○	○	○	○	
22		○	○	○	○	
23		○	○	○	○	
24		○	○	○	○	
25		○	○	○	○	
26		○	○	○	○	
27		○	○	○	○	
28		○	○	○	○	
29		○	○	○	○	
30		○	○	○	○	

Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Ahtesham*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **~61 ft** End **Same**                      Start **~54'** End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **~80'** End **Same**                      Start **~285°** End **Same**

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **~60°** End **Same**                      Start **~285°** End **Same**

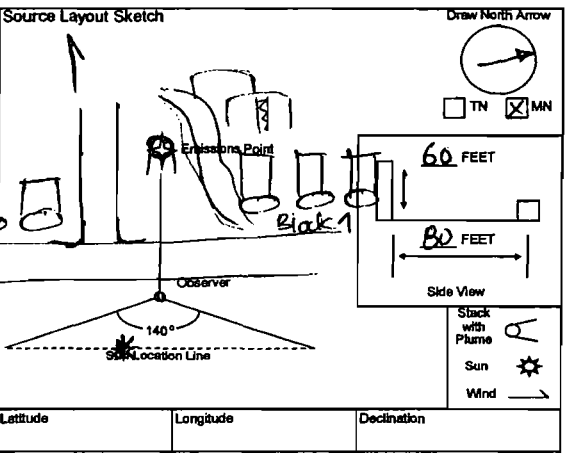
Distance and Direction to Observation Point from Emission Point  
Start **Approx the same** End **Same**

Describe Emissions  
Start **NV** End **NV**  
Emission Color                      Water Droplet Plume  
Start **NV** End **Same**                      Start **NV** End **Same**

Describe Plume Background  
Start **Sky** End **Same**  
Background Color                      Sky Conditions  
Start **Blue** End **Same**                      Start **Overcast** End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph** End **Same**                      Start **W** End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **87°** End **Same**                      **28.01**                      **69%**



Additional Information

**VISUAL EMISSIONS OBSERVATION FORM**

Form Number                      Page                      of  
**by-09-westcounty.fl-comp#1**                      **3**                      **6**

Continued on Form Number                      **RUN 2**

Observation Date	Time Zone	Start Time	End Time	Comments		
<b>07/30/09</b>	<b>EST</b>	<b>15:45</b>	<b>16:45</b>			
Min.	Sec.	0	15	30	45	
1		○	○	○	○	
2		○	○	○	○	
3		○	○	○	○	
4		○	○	○	○	
5		○	○	○	○	
6		○	○	○	○	
7		○	○	○	○	
8		○	○	○	○	
9		○	○	○	○	
10		○	○	○	○	
11		○	○	○	○	
12		○	○	○	○	
13		○	○	○	○	
14		○	○	○	○	
15		○	○	○	○	
16		○	○	○	○	
17		○	○	○	○	
18		○	○	○	○	
19		○	○	○	○	
20		○	○	○	○	
21		○	○	○	○	
22		○	○	○	○	
23		○	○	○	○	
24		○	○	○	○	
25		○	○	○	○	
26		○	○	○	○	
27		○	○	○	○	
28		○	○	○	○	
29		○	○	○	○	
30		○	○	○	○	

Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Ahtesham*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **-61 ft**    End **Same**                      Start **-54'**    End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **-80'**    End **Same**                      Start **-285°**    End **Same**

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **-60°**    End **Same**                      Start **-285°**    End **Same**

Distance and Direction to Observation Point from Emission Point  
Start **Approx the same**    End **Same**

Describe Emissions  
Start **NV**                      End **NV**

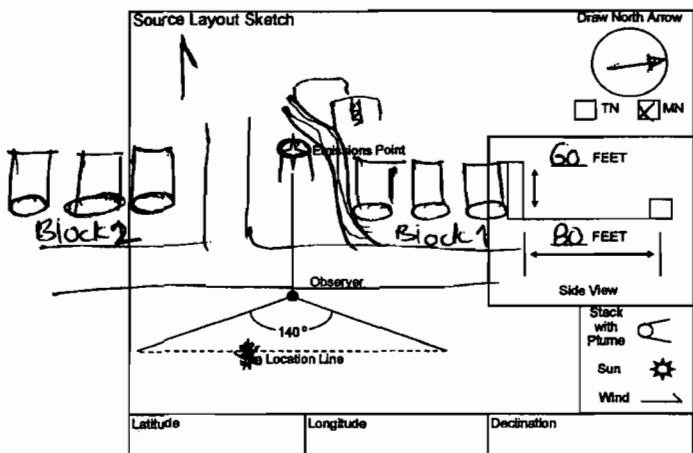
Emission Color                      Water Droplet Plume  
Start **NV**    End **Same**                      Start **NV**    End **Same**

Describe Plume Background  
Start **Sky**                      End **Same**

Background Color                      Sky Conditions  
Start **Blue**    End **Same**                      Start **Overcast**    End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph**    End **Same**                      Start **W**    End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **87°**    End **Same**                      Start **28.01**                      End **69%**



Additional Information

## VISUAL EMISSIONS OBSERVATION FORM

Form Number                      Page                      of  
**bv-09-westcounty.fl-comp#1**                      4                      6

Continued on Form Number                      **RUN 2**

Min.	Sec.	Time Zone				End Time
		0	15	30	45	
Observation Date		EST				Start Time
07/30/09		15:45				16:45
Comments						
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Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Ahtesham*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **~61 ft**    End **Same**    Start **~54'**    End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **~80'**    End **Same**    Start **~285°**    End **Same**

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **~60°**    End **Same**    Start **~285°**    End **Same**

Distance and Direction to Observation Point from Emission Point  
Start **Approx the same**    End **Same**

Describe Emissions  
Start **NV**                      End **NV**

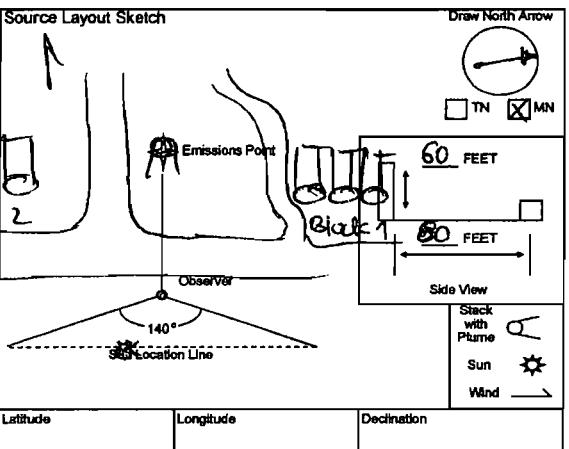
Emission Color                      Water Droplet Plume  
Start **NV**    End **Same**    Start **NV**    End **Same**

Describe Plume Background  
Start **Sky**                      End **Same**

Background Color                      Sky Conditions  
Start **Blue**    End **Same**    Start **Overcast**    End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph**    End **Same**    Start **W**    End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **86°**    End **Same**    Start **29.83**    End **69%**



Additional Information

## VISUAL EMISSIONS OBSERVATION FORM

Form Number                      Page                      of  
**bv-09-westcounty.fl-comp#1**                      5                      6

Continued on Form Number                      **RUN 3**

Observation Date	Time Zone	Start Time	End Time			
<b>07/30/09</b>	<b>EST</b>	<b>16:45</b>	<b>17:45</b>			
Min.	Sec.	0	15	30	45	Comments
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Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Mohd. Ahtesham Hussain*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

Method Used (Circle One)  
 Method 9    203A    203B    Other: \_\_\_\_\_

Company Name  
**Black & Veatch and Florida Light and**

Facility Name  
**West County Energy Center**

Street Address  
**20505 State Road 80**

City                      State                      Zip  
**Loxahatchee                      FL                      33470**

Process                      Unit #                      Operating Mode  
**Auxiliary Boiler                      AB                      100%**

Control Equipment                      Operating Mode  
**Natural Gas                      99.8 MMBtu/hr**

Describe Emissions Point  
**Round Stack, 5ft 5 inches in diameter, 60 ft above grade level, Between blocks 1 and 2**

Height of Emiss. Pt.                      Height of Emiss. Pt. Rel. to Observer  
Start **~61 ft**    End **Same**    Start **~54'**    End **Same**

Distance to Emiss. Pt.                      Direction to Emiss. Pt. (Degrees)  
Start **~80'**    End **Same**    Start **~285°**    End **Same**

Vertical Angle to Obs. Pt.                      Direction to Obs. Pt. (Degrees)  
Start **~60°**    End **Same**    Start **~285°**    End **Same**

Distance and Direction to Observation Point from Emission Point  
Start **Approx the same**    End **Same**

Describe Emissions  
Start **NV**    End **NV**

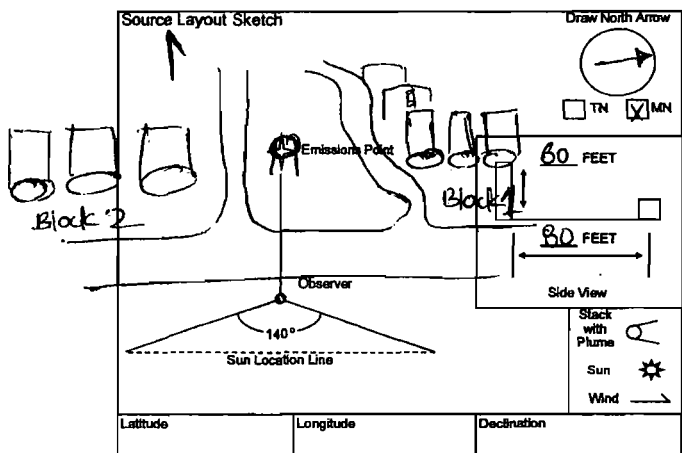
Emission Color                      Water Droplet Plume  
Start **NV**    End **Same**    Start **NV**    End **Same**

Describe Plume Background  
Start **Sky**    End **Same**

Background Color                      Sky Conditions  
Start **Blue**    End **Same**    Start **Overcast**    End **Same**

Wind Speed                      Wind Direction  
Start **0-5mph**    End **Same**    Start **W**    End **Same**

Ambient Temp.                      Barometric Pressure                      RH Percent  
Start **86°**    End **Same**    Start **29.83**    End **69%**



Additional Information

## VISUAL EMISSIONS OBSERVATION FORM

Form Number                      Page                      of  
**bv-09-westcounty.fi-comp#1                      6                      6**

Continued on Form Number                      RUN 3

Observation Date                      Time Zone                      Start Time                      End Time  
**07/30/09                      EST                      16:45                      17:45**

Min.	Sec.	Time				Comments
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Observer's Name (Print)                      **Mohd. Ahtesham Hussain**

Observer's Signature                      *Ahtesham*                      Date                      **07/30/09**

Organization                      **Air Hygiene International, Inc**

Certified By                      **ETA**                      Date                      **04/22/2009**

**TEST RESULTS AND CALCULATIONS**

**Calculations**



**EXAMPLE CALCULATIONS (FFACTOR)**

RM 19, (07-19-06),  
2.0 Summary of Method,  
2.1 Emission Rates. Oxygen  
(O<sub>2</sub>) or carbon dioxide (CO<sub>2</sub>)  
concentrations and appropriate F  
factors (ratios of combustion gas  
volumes to heat inputs) are used  
to calculate pollutant emission  
rates from pollutant  
concentrations.

Mark's Std Hdbk, 10th ed., pg 4-26  
**High Heat Value Dry (HHV<sub>dry</sub>)**, calc for Methane (single component for the fuel gas)

$$HHV_{dry} (Btu / SCF) = \left[ \left( \frac{M_{\%}}{100} \right) \times GCM \right] \quad HHV_{dry} = \frac{96.90 \%}{100.00} \times \frac{994.85 \text{ Btu}}{\text{SCF}} = \frac{963.97 \text{ Btu}}{\text{SCF}}$$

Mark's Std Hdbk, 10th ed., pg 4-26  
**Low Heat Value Dry (LHV<sub>dry</sub>)**, calc for Methane (single component for the fuel gas)

$$LHV_{dry} (Btu / SCF) = \left[ \left( \frac{M_{\%}}{100} \right) \times NCM \right] \quad LHV_{dry} = \frac{96.90 \%}{100.00} \times \frac{895.75 \text{ Btu}}{\text{SCF}} = \frac{867.95 \text{ Btu}}{\text{SCF}}$$

RM 19, (07-19-06),  
12.2 Emission Rates of PM,  
SO<sub>2</sub>, and NO<sub>x</sub>. Select from the  
following sections the applicable  
procedure to compute the PM,  
SO<sub>2</sub>, or NO<sub>x</sub> emission rate (E) in  
lb/MMBtu. The pollutant  
concentration must be in lb/scf  
and the F factor must be in  
scf/MMBtu. If the pollutant  
concentration (C) is not in the  
appropriate units, use Table  
19-1 in Section 17.0 to make the  
proper conversion. An F factor is  
the ratio of the gas volume of the  
products of combustion to the  
heat content of the fuel. The dry  
F factor (F<sub>d</sub>) includes all  
components of combustion less  
water, the wet F factor (F<sub>w</sub>)  
includes all components of  
combustion, and the carbon F  
factor (F<sub>c</sub>) includes only carbon  
dioxide.

Civil Eng. Ref. Man., 7th Ed., pg 14-9/GPA Ref. Bulletin 181-86, App. C  
**High Heat Value Wet (HHV<sub>wet</sub>)**, calc for entire sample (all components of the fuel gas)

$$HHV_{wet} (Btu / SCF) = \frac{HHV_{dry}}{W / D. factor} \quad HHV_{wet} = \frac{996.58 \text{ Btu/SCF}}{1.0236} = 973.60 \text{ Btu/SCF}$$

Civil Eng. Ref. Man., 7th Ed., pg 14-9/GPA Ref. Bulletin 181-86, App. C  
**Low Heat Value Wet (LHV<sub>wet</sub>)**, calc for entire sample (all components of the fuel gas)

$$LHV_{wet} (Btu / SCF) = \frac{LHV_{dry}}{W / D. factor} \quad LHV_{wet} = \frac{897.83 \text{ Btu/SCF}}{1.0236} = 877.13 \text{ Btu/SCF}$$

**Lbs Component per Lb-Mol of Gas (CM)**, calc for Methane (single component for the fuel gas)

$$CM (lb / lb - mol) = \left[ \left( \frac{M_{\%}}{100} \right) \times MW \right] \quad CM = \frac{96.90 \%}{100.00} \times \frac{16.04 \text{ lb}}{\text{lb-mol}} = 15.55 \text{ lb/lb-mol}$$

ASTM D 3588  
**Fuel Molecular Weight (MW<sub>Fuel</sub>)**  
 $MW_{Fuel} (lb / lb \cdot mol) = \left[ \sum (CM) \right]$   
MW<sub>Fuel</sub> = 15.55 lb/lb-mol  
+ 0.43 lb/lb-mol  
+ etc. = 16.651 lb/lb-mol

**Btu per Lb of Gas Gross (GCV)**  
 $GCV (Btu / lb) = \left[ \frac{HHV_{dry} \times G}{MW_{Fuel}} \right]$   
GCV =  $\frac{996.58 \text{ Btu/SCF} \times 385.23 \text{ ft}^3/\text{lbmol}}{16.651 \text{ lb/lb-mol}} = 23,056.33 \text{ Btu/lb}$

ASTM D 3588 (SG)  
**Specific Gravity**  $SG = \left[ \frac{MW_{Fuel}}{MW_{AIR}} \right]$  SG =  $\frac{16.65 \text{ lb/lb-mol}}{28.96 \text{ lb/lb-mol}} = 0.5749$

**Btu per Lb of Gas Net (NCV)**  
 $NCV (Btu / lb) = \left[ \frac{LHV_{dry} \times G}{MW_{Fuel}} \right]$   
NCV =  $\frac{897.83 \text{ Btu/SCF} \times 385.23 \text{ ft}^3/\text{lbmol}}{16.651 \text{ lb/lb-mol}} = 20,771.83 \text{ Btu/lb}$

**Weight Percent of Component (C<sub>w</sub>), methane**  
 $C_w (\%) = \left[ \left( \frac{CM}{MW_{Fuel}} \right) \times 100 \right]$   
C<sub>w</sub> =  $\frac{15.55 \text{ lb/lb-mol}}{16.65 \text{ lb/lb-mol}} \times 100 = 93.36 \%$

RM 19, (07-19-06), **Weight Percent of Volatile Organic Compounds (VOC<sub>w</sub>)**  
 $VOC_w (\%) = \left[ \sum \frac{C_i M_i}{C_T M_T} \right]$  VOC<sub>w</sub> = 0.50 % + 0.08 % + 0.10 % + etc. = 0.82 %

RM 19, (07-19-06), 12.3.2 Determined F Factors. If the fuel burned is not listed in Table 19-2 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19-2, use the procedure below: 12.3.2.1 Equations. Use the eq

RM 19, (07-19-06),  
12.1 Nomenclature  
**K (scf/lb)/%**

H	3.64
C	1.53
S	0.57
N <sub>2</sub>	0.14
O <sub>2</sub>	0.46

$$F_d = \frac{K(K_{hd} \% H + K_c \% C + K_s \% S + K_n \% N - K_o \% O)}{GCV} \quad \text{Eq. 19-13}$$

$$F_d = \frac{10^6 \text{ Btu}}{\text{MMBtu}} \times \left[ \frac{3.64 \text{ SCF}}{\text{lb} \cdot \%} \times 24.13 \% + \frac{1.53 \text{ SCF}}{\text{lb} \cdot \%} \times 73.29 \% + \frac{0.57 \text{ SCF}}{\text{lb} \cdot \%} \times 0.00 \% + \frac{0.14 \text{ SCF}}{\text{lb} \cdot \%} \times 0.84 \% - \frac{0.46 \text{ SCF}}{\text{lb} \cdot \%} \times 1.74 \% \right] \times \frac{\text{lb}}{23,056.33 \text{ Btu}} = \frac{8,643.47 \text{ SCF}}{\text{MMBtu}}$$

**EXAMPLE CALCULATIONS (INFORMATION)**

**Specific Humidity (RH<sub>sp</sub>)**

Note: RH<sub>sp</sub> (gr/lb) calculated using temperature, relative humidity, and barometric pressure with psychrometric chart, psychrometric calculator, or built in psychrometric algorithm.

$$RH_{sp} (lb/lb) = \left[ \left( \frac{gr}{lb} \right) \times \frac{lb}{7000gr} \right]$$

$$RH_{sp} = \frac{130.28 \text{ gr}}{lb} \times \frac{1 \text{ lb}}{7000 \text{ gr}} = 0.018611 \frac{\text{lb H}_2\text{O}}{\text{lb Air}}$$

**Heat Rate (MMBtu/hr)**

$$HR = \frac{HHV_{DRY} \times Q_f}{1,000,000}$$

$$\text{Heat Rate} = \frac{996.58 \text{ Btu}}{\text{SCF}} \times \frac{90,932.12 \text{ SCF}}{\text{hr}} \times \frac{\text{MMBtu}}{10^6 \text{ Btu}} = \frac{90.62 \text{ MMBtu}}{\text{hr}}$$

**EXAMPLE CALCULATIONS (CALIBRATION)**

**Analyzer Calibration Error**

RM 7E, (08-15-06), 12.2 Analyzer Calibration Error. For non-dilution systems, use Equation 7E-1 to calculate the analyzer calibration error for the low-, mid-, and high-level calibration gases. (calc for NOx analyzer mid gas, if applicable)

$$ACE = \left( \frac{C_{Dir} - C_V}{CS} \right) \times 100 \quad \text{Eq. 7E-1}$$

$$ACE = \frac{28.90 \text{ ppm} - 28.70 \text{ ppm}}{54.60 \text{ ppm}} \times 100 = 0.37 \%$$

**EXAMPLE CALCULATIONS (BIAS, DRIFT, AND CORRECTED RAW AVERAGE)**

**System Bias**

RM 7E, (08-15-06), 12.3 System Bias. For non-dilution systems, use Equation 7E-2 to calculate the system bias separately for the low-level and upscale calibration gases. (calc for NOx analyzer upscale gas, Run 1 initial bias, if applicable)

$$SB = \left( \frac{C_s - C_{Dir}}{CS} \right) \times 100 \quad \text{Eq. 7E-2}$$

$$SB = \frac{27.75 \text{ ppm} - 28.90 \text{ ppm}}{54.60 \text{ ppm}} \times 100 = -2.11 \%$$

**Drift Assessment**

RM 7E, (08-15-06), 12.5 Drift Assessment. Use Equation 7E-4 to separately calculate the low-level and upscale drift over each test run. (calc for NOx analyzer upscale drift, Run 1, if applicable)

$$D = |SB_{final} - SB_i| \quad \text{Eq. 7E-4}$$

$$D = | -2.36 \% - -2.11 \% | = 0.26 \%$$

**Bias Adjusted Average**

RM 7E, (08-15-06), 12.6 Effluent Gas Concentration. For each test run, calculate C<sub>avg</sub>, the arithmetic average of all valid NOx concentration values (e.g., 1-minute averages). Then adjust the value of C<sub>avg</sub> for bias, using Equation 7E-5. (calc for NOx analyzer, Run 1, if applicable)

$$C_{Gas} = (C_{Avg} - C_o) \times \left( \frac{C_M - C_o}{C_M - C_o} \right) \quad \text{Eq. 7E-5}$$

$$C_{Gas} = \left[ 32.27 \text{ ppm} - 0.38 \text{ ppm} \right] \times \left( \frac{28.70 \text{ ppm}}{27.68 \text{ ppm} - 0.38 \text{ ppm}} \right) = 33.52 \text{ ppm}$$

**EXAMPLE CALCULATIONS (RUNS)**

**Stack Exhaust Flow (Q<sub>s</sub>) - RM19**

$$Q_s = \left( \frac{FFactor \times Q_f \times HHV}{1,000,000} \right) \times \left( \frac{20.9\%}{20.9\% - C_{Gas(O_2)}} \right)$$

$$Q_s = \frac{8,643.47 \text{ SCF}}{\text{MMBtu}} \times \frac{90,932.12 \text{ SCF}}{\text{hr}} \times \frac{996.58 \text{ Btu}}{\text{SCF}} \times \frac{\text{MMBtu}}{10^6 \text{ Btu}} \times \left[ \frac{20.90\%}{20.9\% - 5.6\%} \right] = 1,072,274.78 \text{ SCFH}$$

**Diluent-Corrected Pollutant Concentration, O<sub>2</sub> Based**

RM 20, (11-26-02), 7.3.1 Correction of Pollutant Concentration Using O<sub>2</sub> Concentration. Calculate the O<sub>2</sub> corrected pollutant concentration, as follows: (calc for NOx gas, Run 1, if applicable)

$$C_{adj} = C_{Gas(T arg ct)} \times \left( \frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O_2)}} \right) \quad \text{Eq. 20-4}$$

$$C_{adj} = 33.52 \text{ ppm} \times \left( \frac{20.9\% - 3.00\%}{20.9\% - 5.63\%} \right) = 39.31 \text{ ppm}@3\%O_2$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

**EXAMPLE CALCULATIONS (RUNS)****Emissions Rate (lb/MMBtu)**

RM 19, (07-19-06), 12.2 Emission Rates of PM, SO<sub>2</sub>, and NOx. Select from the following sections the applicable procedure to compute the PM, SO<sub>2</sub>, or NOx emission rate (E) in ng/J (lb/million Btu). (calc for NOx gas Run 1, if applicable)

**Oxygen Based**

12.2.1 Oxygen-Based F Factor, Dry Basis. When measurements are on a dry basis for both O<sub>2</sub> (%O<sub>2</sub>d) and pollutant (Cd) concentrations, use the following equation:

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d \text{ Factor} \times Conv_c \times 20.9\%}{20.9\% - C_{Gas(O_2)}} \quad \text{Eq. 19-1}$$

$$E_{lb/MMBtu} = \frac{33.52 \text{ ppm} \times 8,643.47 \text{ SCF/MMBtu} \times 0.0000001194 \text{ lb/ppm}\cdot\text{ft}^3 \times 20.9\%}{20.9\% - 5.63\%} = \frac{0.047 \text{ lb}}{\text{MMBtu}}$$

**Conversion Constant**

Conv<sub>c</sub> for NOx

$$Conv_c (\text{lb} / \text{ppm} \cdot \text{ft}^3) = \frac{MW}{10^6 G}$$

$$Conv_c = \frac{46.01 \text{ lb}}{\text{lb}\cdot\text{mole}} \times \frac{\text{lb}\cdot\text{mole}}{385.23 \text{ SCF}} = \frac{0.0000001194 \text{ lb}}{\text{ppm}\cdot\text{ft}^3}$$

Note: Lack of significant figures may cause rounding errors between actual calculations and example calculations.

**RM 7E, (08-15-06), 12.1 Nomenclature. The terms used in the equations are defined as follows:**

ACE = Analyzer calibration error, percent of calibration span.  
B<sub>WS</sub> = Moisture content of sample gas as measured by Method 4 or other approved method, percent/100.  
C<sub>Avg</sub> = Average unadjusted gas concentration indicated by data recorder for the test run.  
C<sub>D</sub> = Pollutant concentration adjusted to dry conditions.  
C<sub>Dir</sub> = Measured concentration of a calibration gas (low, mid, or high) when introduced in direct calibration mode.  
C<sub>Gas</sub> = Average effluent gas concentration adjusted for bias.  
C<sub>M</sub> = Average of initial and final system calibration bias (or 2-point system calibration error) check responses for the upscale calibration gas.  
C<sub>MA</sub> = Actual concentration of the upscale calibration gas, ppmv.  
C<sub>O</sub> = Average of the initial and final system calibration bias (or 2-point system calibration error) check responses from the low-level (or zero) calibration gas.  
C<sub>S</sub> = Measured concentration of a calibration gas (low, mid, or high) when introduced in system calibration mode.  
C<sub>SS</sub> = Concentration of NOx measured in the spiked sample.  
C<sub>Spika</sub> = Concentration of NOx in the undiluted spike gas.  
C<sub>Calc</sub> = Calculated concentration of NOx in the spike gas diluted in the sample.  
C<sub>V</sub> = Manufacturer certified concentration of a calibration gas (low, mid, or high).  
C<sub>W</sub> = Pollutant concentration measured under moist sample conditions, wet basis.  
CS = Calibration span.  
D = Drift assessment, percent of calibration span.  
E<sub>p</sub> = The predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level response.  
Eff<sub>NO2</sub> = NO<sub>2</sub> to NO converter efficiency, percent.  
H = High calibration gas, designator.  
L = Low calibration gas, designator.  
M = Mid calibration gas, designator.  
NOFinal = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.  
NOxCorr = The NOx concentration corrected for the converter efficiency.  
NOxFinal = The final NOx concentration observed during the converter efficiency test in Section 16.2.2.  
NOxPeak = The highest NOx concentration observed during the converter efficiency test in Section 16.2.2.  
Q<sub>Spika</sub> = Flow rate of spike gas introduced in system calibration mode, L/min.  
Q<sub>Total</sub> = Total sample flow rate during the spike test, L/min.  
R = Spike recovery, percent.  
SB = System bias, percent of calibration span.  
SB<sub>i</sub> = Pre-run system bias, percent of calibration span.  
SB<sub>f</sub> = Post-run system bias, percent of calibration span.  
SB / D<sub>AH</sub> = Alternative absolute difference criteria to pass bias and/or drift checks.  
SCE = System calibration error, percent of calibration span.  
SCE<sub>i</sub> = Pre-run system calibration error, percent of calibration span.  
SCE<sub>final</sub> = Post-run system calibration error, percent of calibration span.  
Z = Zero calibration gas, designator.

**40CFR60.355(b)(1), (09-20-06), Nomenclature. The terms used in the equations are defined as follows:**

P<sub>r</sub> = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg  
P<sub>o</sub> = observed combustor inlet absolute pressure at test, mm Hg  
H<sub>o</sub> = observed humidity of ambient air, g H<sub>2</sub>O/g air  
e = transcendental constant, 2.718  
T<sub>a</sub> = ambient temperature, K

**RM 19, (07-29-06), 12.1 Nomenclature. The terms used in the equations are defined as follows:**

AdjFactor = Percent oxygen or carbon dioxide adjustment applied to a target pollutant  
 $B_{wa}$  = Moisture fraction of ambient air, percent.  
 Btu = British thermal unit  
 $\%_C$  = Concentration of carbon from an ultimate analysis of fuel, weight percent.  
 $\%_{CO2d}, \%_{CO2w}$  = Concentration of carbon dioxide on a dry and wet basis, respectively, percent.  
 CIP / CDP = Combustor inlet pressure / compressor discharge pressure (mm Hg); note, some manufactures reference as PCD.  
 $E$  = Pollutant emission rate, ng/J (lb/million Btu).  
 $E_a$  = Average pollutant rate for the specified performance test period, ng/J (lb/million Btu).  
 $E_{so}, E_{si}$  = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).  
 $E_{bi}$  = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).  
 $E_{bo}$  = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).  
 $E_{ci}$  = Pollutant rate in combined effluent, ng/J (lb/million Btu).  
 $E_{co}$  = Pollutant emission rate in combined effluent, ng/J (lb/million Btu).  
 $E_d$  = Average pollutant rate for each sampling period (e.g., 24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (e.g., amount of fuel bunkered), ng/J (lb/million Btu).  
 $E_{di}$  = Average inlet SO<sub>2</sub> rate for each sampling period d, ng/J (lb/million Btu).  
 $E_g$  = Pollutant rate from gas turbine, ng/J (lb/million Btu).  
 $E_{ga}$  = Daily geometric average pollutant rate, ng/J (lb/million Btu) or ppm corrected to 7 percent O<sub>2</sub>.  
 $E_{jo}, E_{ji}$  = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O<sub>2</sub>.  
 $E_h$  = Hourly average pollutant, ng/J (lb/million Btu).  
 $E_{hj}$  = Hourly arithmetic average pollutant rate for hour "j," ng/J (lb/million Btu) or ppm corrected to 7 percent O<sub>2</sub>.  
 EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.  
 $F_c$  = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19  
 $F_d, F_w, F_c$  = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).  
 $ft^3$  = cubic feet  
 $G$  = ideal gas conversion factor  
 (385.23 SCF/lb-mol at 68 deg F & 14.696 psia)  
 $GCM$  = gross Btu per SCF (constant, compound based)  
 $GCV$  = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).  
 $GCV_p, GCV_r$  = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).  
 $\%_{H_2}$  = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.  
 $H_b$  = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).  
 $H_g$  = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).  
 $\%_{H_2O}$  = Concentration of water from an ultimate analysis of fuel, weight percent.  
 $H_t$  = Total numbers of hours in the performance test period (e.g., 720 hours for 30-day performance test period).  
 $K$  = volume of combustion component per pound of component (constant)  
 $K$  = Conversion factor,  $10^{-5} (kJ/J)/(\%) [10^6 \text{ Btu/million Btu}]$ .  
 $K_c = (9.57 \text{ scm/kg})/(\%) [(1.53 \text{ scf/lb})/(\%)]$ .  
 $K_{cd} = (2.0 \text{ scm/kg})/(\%) [(0.321 \text{ scf/lb})/(\%)]$ .  
 $K_{hd} = (22.7 \text{ scm/kg})/(\%) [(3.64 \text{ scf/lb})/(\%)]$ .  
 $K_{hw} = (34.74 \text{ scm/kg})/(\%) [(5.57 \text{ scf/lb})/(\%)]$ .  
 $K_n = (0.86 \text{ scm/kg})/(\%) [(0.14 \text{ scf/lb})/(\%)]$ .  
 $K_o = (2.85 \text{ scm/kg})/(\%) [(0.46 \text{ scf/lb})/(\%)]$ .  
 $K_s = (3.54 \text{ scm/kg})/(\%) [(0.57 \text{ scf/lb})/(\%)]$ .  
 $K_{sulfur} = 2 \times 10^4 \text{ Btu/wt}\% \text{-MMBtu}$   
 $K_w = (1.30 \text{ scm/kg})/(\%) [(0.21 \text{ scf/lb})/(\%)]$ .  
 lb = pound  
 $\ln$  = Natural log of indicated value.  
 $L_p, L_r$  = Weight of the product and raw fuel lots, respectively, metric ton (ton).  
 $\%_N$  = Concentration of nitrogen from an ultimate analysis of fuel, weight percent.  
 $M_{\%}$  = mole percent  
 mol = mole  
 $MW$  = molecular weight (lb/lb-mol)  
 $MW_{AIR}$  = molecular weight of air ( 28.9625 lb/lb-mole)<sup>1</sup>  
 $NCM$  = net Btu per SCF (constant based on compound)  
 $\%_O$  = Concentration of oxygen from an ultimate analysis of fuel, weight percent.  
 $\%_{O2d}, \%_{O2w}$  = Concentration of oxygen on a dry and wet basis, respectively, percent.  
 $P_B$  = barometric pressure, in Hg  
 $P_s$  = Potential SO<sub>2</sub> emissions, percent.  
 $\%_S$  = Sulfur content of as-fired fuel lot, dry basis, weight percent.  
 $S_o$  = Standard deviation of the hourly average pollutant rates for each performance test period, ng/J (lb/million Btu).  
 $\%_{S_1}$  = Concentration of sulfur from an ultimate analysis of fuel, weight percent.  
 $S(\text{wt}\%)$  = weight percent of sulfur, per lab analysis by appropriate ASTM standard  
 $S_i$  = Standard deviation of the hourly average inlet pollutant rates for each performance test period, ng/J (lb/million Btu).  
 $S_o$  = Standard deviation of the hourly average emission rates for each performance test period, ng/J (lb/million Btu).  
 $\%S_p, \%S_r$  = Sulfur content of the product and raw fuel lots respectively, dry basis, weight percent.  
 SCF = standard cubic feet  
 SH = specific humidity, pounds of water per pound of air  
 $t_{0.95}$  = Values shown in Table 19-3 for the indicated number of data points n.  
 $T_{amb}$  = ambient temperature, °F  
 $W/D \text{ Factor} = 1.0236 = \text{conv. at } 14.696 \text{ psia and } 68 \text{ deg F (ref. Civil Eng. Ref. Manual, 7th Ed.)}$   
 $X_{CO_2}$  = CO<sub>2</sub> Correction factor, percent.  
 $X_k$  = Fraction of total heat input from each type of fuel k.

# Calculations, Formulas, and Constants

The following information supports the spreadsheets for this testing project.

## Given Data:

Ideal Gas Conversion Factor = 385.23 SCF/lb-mol at 68 deg F & 14.696 psia

Fuel Heating Value is based upon Air Hygiene's fuel gas calculation sheet. All calculations are based upon a correction to 68 deg F & 14.696 psia

High Heating Values (HHV) are used for the Fuel Heating Value, F-Factor, and Fuel Flow Data per EPA requirements.

### ASTM D 3588

Molecular Weight of NOx (lb/lb-mole) = 46.01  
 Molecular Weight of CO (lb/lb-mole) = 28.00  
 Molecular Weight of SO<sub>2</sub> (lb/lb-mole) = 64.00  
 Molecular Weight of THC (propane) (lb/lb-mole) = 44.00  
 Molecular Weight of VOC (methane) (lb/lb-mole) = 16.00  
 Molecular Weight of NH<sub>3</sub> (lb/lb-mole) = 17.03  
 Molecular Weight of HCHO (lb/lb-mole) = 30.03

### 40CFR60, App. A, RM 19, Table 19-1

Conversion Constant for NOx = 0.0000001194351  
 Conversion Constant for CO = 0.0000000726839  
 Conversion Constant for SO<sub>2</sub> = 0.0000001661345  
 Conversion Constant for THC = 0.0000001142175  
 Conversion Constant for VOC (methane) = 0.0000000415336  
 Conversion Constant for NH<sub>3</sub> = 0.0000000442074  
 Conversion Constant for HCHO = 0.0000000779534

NOTE: units are lb/ppm\*ft<sup>3</sup>

## Formulas:

1. Corrected Raw Average (C<sub>Gas</sub>), 40CFR60, App. A, RM 7E, Eq. 7E-5 (08/15/06)

$$C_{Gas} = (C_{Avg} - C_O) \times \left( \frac{C_{MA}}{C_M - C_O} \right)$$

2. Correction to % O<sub>2</sub>, 40CFR60, App. A, RM 20, Eq. 20-5 (11/26/02)

$$C_{adj} = C_{Gas(Target)} \times \left( \frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O_2)}} \right)$$

3. Correction to % O<sub>2</sub> and ISO Conditions

$$C_{ISO} = C_{adj} \times \sqrt{\frac{P_r}{P_o}} \times e^{(19 \times (H_o - 0.00633))} \times \left( \frac{288}{T_a} \right)^{1.53}$$

4. Method 19 stack exhaust flow (scfh)

$$Q_s = \left( \frac{FFactor \times Q_f \times HHV}{1,000,000} \right) \times \left( \frac{20.9\%}{20.9\% - C_{Gas(O_2)}} \right)$$

5. Emission Rate in lb/hr

$$E_{lb/hr} = \frac{C_{Gas}}{10^6} \times \frac{Q_s \times MW}{G}$$

6. Emission Rate in tons per year

$$E_{ton/yr} = \frac{E_{lb/hr} \times hr_{year}}{2000}$$

7. Emission Concentration in lb/MMBtu (O<sub>2</sub> based)

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_c \times 20.9\%}{20.9\% - C_{Gas(O_2)}}$$

8. Emission Concentration in g/hp\*hr

$$E_{g/hp-hr} = \frac{E_{lb/hr} \times 453.6}{mw \times 1314.022} \text{ or } \frac{E_{lb/hr} \times 453.6}{hp}$$

**APPENDIX B**  
**UNIT OPERATION PARAMETERS**

# Florida Power and Light

<b>Air Permit # :</b>	PSD-FL-354
<b>Plant Name or Location:</b>	West County Energy Center
<b>Date:</b>	July 30, 2009
<b>Project Number:</b>	bv-09-westcounty.fl-comp#1
<b>Manufacturer &amp; Equipment:</b>	Babcock and Wilcox
<b>Permit ID Number:</b>	009
<b>Test Load:</b>	Full
<b>Tester(s) / Test Unit(s):</b>	JF/AH/210

		RUN		
	UNITS	1-1	1-2	1-3
<b>Start Time</b>	hh:mm:ss	14:45:25	15:54:25	17:02:25
<b>End Time</b>	hh:mm:ss	15:44:55	16:53:55	18:01:55
<b>Bar. Pressure</b>	in. Hg	30.21	29.88	29.83
<b>Amb. Temp.</b>	°F	86	87	86
<b>Rel. Humidity</b>	%	70	69	69
<b>Spec. Humidity</b>	lb water / lb air	0.018611	0.019164	0.018578
<b>Aux Boiler Fuel Flow</b>	SCFH	90,932	90,434	89,769
<b>Heat Input</b>	MMBtu/hr	90.6	90.1	89.5
<b>Steam Flow Rate</b>	lb/hr	59713.5	60017.4	59307.1
<b>Jackshaft Positioner</b>	%	99.99	99.99	99.98
<b>Feedwater Flow</b>	lb/hr	70,701.94	71,041.23	70,886.12
<b>Firing Rate Demand</b>	%	99.99	99.99	99.98
<b>Steam Drum Pressure</b>	PSIG	336.10	336.37	336.29
<b>Steam Drum Temp.</b>	°F	427.27	427.77	427.61
<b>Steam Flow Pressure</b>	PSIG	301.93	301.76	301.61
<b>Steam Header Temp.</b>	°F	600.31	600.61	600.48
<b>CT-A Cooling STM Flow</b>	lb/hr	0.03	0.03	0.04
<b>CT-B Cooling STM Flow</b>	lb/hr	141.07	141.13	121.79
<b>CT-C Cooling STM Flow</b>	lb/hr	107.07	115.25	115.69
<b>Fuel Gas Pressure</b>	PSIG	26.62	26.39	26.23



**UNIT OPERATION PARAMETERS**

**Operations Data**

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow	CT-B Cooling STM Flow	CT-A Cooling STM Flow
7/30/2009	2:45:35 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	103.748	141.315	0.034
7/30/2009	2:46:31 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	95.981	143.207	0.034
7/30/2009	2:47:28 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	97.354	141.879	0.034
7/30/2009	2:48:24 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	100.345	139.178	0.034
7/30/2009	2:49:21 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	103.046	141.330	0.034
7/30/2009	2:50:17 PM	27.128	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	102.069	141.742	0.034
7/30/2009	2:51:14 PM	26.681	91057.117	99.985	70686.570	99.985	336.057	426.942	60009.504	302.079	600.237	97.507	141.254	0.034
7/30/2009	2:52:10 PM	26.681	91057.117	99.985	72087.602	99.985	336.057	426.942	58841.055	302.079	600.237	99.063	139.514	0.034
7/30/2009	2:53:07 PM	26.681	91057.117	99.985	72087.602	99.985	336.057	426.942	58841.055	302.079	600.237	102.039	140.201	0.034
7/30/2009	2:54:03 PM	26.681	91057.117	99.985	72087.602	99.985	336.057	426.942	58841.055	302.079	600.237	100.375	142.673	0.034
7/30/2009	2:55:00 PM	26.681	91057.117	99.985	70728.281	99.985	336.057	426.942	58841.055	302.079	600.237	101.627	140.613	0.034
7/30/2009	2:55:56 PM	26.681	91057.117	99.985	69420.492	99.985	336.057	426.942	58841.055	302.079	600.237	101.718	140.475	0.034
7/30/2009	2:56:53 PM	26.681	91057.117	99.985	69420.492	99.985	336.057	426.942	60021.430	302.079	600.237	97.476	141.818	0.034
7/30/2009	2:57:49 PM	26.681	91057.117	99.985	69420.492	99.985	336.057	426.942	60021.430	302.079	600.237	97.232	141.971	0.034
7/30/2009	2:58:46 PM	26.681	91057.117	99.985	69420.492	99.985	336.057	426.942	60021.430	302.079	600.237	98.453	139.285	0.034
7/30/2009	2:59:42 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60021.430	302.079	600.237	97.217	142.535	0.034
7/30/2009	3:00:39 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60021.430	302.079	600.237	102.176	138.828	0.034
7/30/2009	3:01:35 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60021.430	302.079	600.237	102.039	138.766	0.034
7/30/2009	3:02:32 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	59020.316	302.079	600.237	100.696	142.078	0.034
7/30/2009	3:03:28 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	59020.316	302.079	600.237	100.665	141.437	0.034
7/30/2009	3:04:25 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	59020.316	302.079	600.237	100.467	141.147	0.034
7/30/2009	3:05:21 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	59020.316	302.079	600.237	103.290	141.330	0.034
7/30/2009	3:06:18 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60027.254	302.079	600.237	96.866	141.589	0.034
7/30/2009	3:07:14 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60027.254	302.079	600.237	101.962	139.850	0.034
7/30/2009	3:08:11 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60027.254	302.079	600.237	102.512	140.506	0.034
7/30/2009	3:09:07 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60027.254	302.079	600.237	97.293	142.444	0.034
7/30/2009	3:10:04 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	60027.254	302.079	600.237	101.566	139.133	0.034
7/30/2009	3:11:00 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	58993.496	302.079	600.237	104.419	143.375	0.034
7/30/2009	3:11:57 PM	26.681	91057.117	99.985	70723.375	99.985	336.057	426.942	58993.496	302.079	600.237	105.243	139.911	0.034
7/30/2009	3:12:53 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	58993.496	302.079	600.237	112.827	139.835	0.034
7/30/2009	3:13:50 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	58993.496	302.079	600.237	115.771	141.208	0.034

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow KPPH	CT-B Cooling STM Flow KPPH	CT-A Cooling STM Flow KPPH
7/30/2009	3:14:46 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	60009.094	302.079	600.237	118.289	142.001	0.034
7/30/2009	3:15:43 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	119.479	140.857	0.034
7/30/2009	3:16:39 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	117.038	140.872	0.034
7/30/2009	3:17:36 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	114.581	141.010	0.034
7/30/2009	3:18:32 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	105.624	142.673	0.034
7/30/2009	3:19:29 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	111.819	141.299	0.034
7/30/2009	3:20:25 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	114.139	141.299	0.034
7/30/2009	3:21:22 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	426.942	59845.793	302.079	600.237	108.844	141.635	0.034
7/30/2009	3:22:18 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	427.776	59845.793	302.079	600.237	113.025	142.337	0.034
7/30/2009	3:23:15 PM	26.257	91057.117	99.985	70723.375	99.985	336.057	427.776	59845.793	302.079	600.237	113.834	139.026	0.034
7/30/2009	3:24:11 PM	26.227	91057.117	100.000	70723.375	100.000	336.057	427.776	59845.793	302.079	600.237	110.522	140.048	0.034
7/30/2009	3:25:08 PM	26.637	91057.117	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	113.116	141.864	0.034
7/30/2009	3:26:04 PM	26.637	91057.117	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	108.936	139.697	0.034
7/30/2009	3:27:01 PM	26.637	91057.117	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	113.986	140.353	0.034
7/30/2009	3:27:57 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	108.829	143.161	0.034
7/30/2009	3:28:54 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	114.948	138.934	0.034
7/30/2009	3:29:50 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	109.225	139.178	0.034
7/30/2009	3:30:47 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	114.078	143.115	0.034
7/30/2009	3:31:44 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	111.285	142.627	0.034
7/30/2009	3:32:40 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	114.368	139.697	0.034
7/30/2009	3:33:37 PM	26.637	90636.070	100.000	70723.375	100.000	336.057	427.776	59845.793	301.631	600.237	112.399	140.094	0.034
7/30/2009	3:34:33 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.237	113.223	142.215	0.034
7/30/2009	3:35:30 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.237	108.920	140.292	0.034
7/30/2009	3:36:26 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	114.169	140.048	0.034
7/30/2009	3:37:23 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	111.423	142.642	0.034
7/30/2009	3:38:19 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	113.696	140.613	0.034
7/30/2009	3:39:16 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	108.203	140.155	0.034
7/30/2009	3:40:12 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	113.132	143.512	0.034
7/30/2009	3:41:09 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	110.706	143.649	0.034
7/30/2009	3:42:05 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	110.248	142.459	0.034
7/30/2009	3:43:02 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	113.116	139.896	0.034
7/30/2009	3:43:58 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	109.348	139.926	0.034
7/30/2009	3:44:55 PM	26.637	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	115.192	140.964	0.034
Average		26.621	90932.119	99.990	70701.944	99.990	336.097	427.268	59713.537	301.925	600.311	107.075	141.071	0.034

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow KPPH	CT-B Cooling STM Flow KPPH	CT-A Cooling STM Flow KPPH
7/30/2009	3:54:19 PM	26.585	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	114.291	142.200	0.034
7/30/2009	3:55:16 PM	26.585	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	108.890	142.978	0.034
7/30/2009	3:56:12 PM	26.585	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	112.949	140.399	0.034
7/30/2009	3:57:09 PM	26.585	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	107.516	138.751	0.034
7/30/2009	3:58:05 PM	26.585	90636.070	100.000	70723.375	100.000	336.269	427.776	59845.793	301.631	600.708	112.582	140.567	0.034
7/30/2009	3:59:02 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	110.477	142.352	0.034
7/30/2009	3:59:58 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	116.092	142.230	0.034
7/30/2009	4:00:55 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	108.447	140.201	0.034
7/30/2009	4:01:51 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	113.071	140.964	0.034
7/30/2009	4:02:48 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	113.605	143.298	0.034
7/30/2009	4:03:44 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	111.087	143.207	0.034
7/30/2009	4:04:41 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	113.895	138.843	0.034
7/30/2009	4:05:37 PM	26.585	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	115.970	140.506	0.034
7/30/2009	4:06:34 PM	26.173	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	113.986	141.925	0.034
7/30/2009	4:07:30 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	118.793	142.078	0.034
7/30/2009	4:08:27 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	115.787	139.331	0.034
7/30/2009	4:09:23 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	119.891	140.079	0.034
7/30/2009	4:10:20 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	112.231	142.825	0.034
7/30/2009	4:11:16 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	115.939	141.727	0.034
7/30/2009	4:12:13 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	114.108	139.896	0.034
7/30/2009	4:13:09 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	114.642	143.268	0.034
7/30/2009	4:14:06 PM	26.597	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	111.575	138.889	0.034
7/30/2009	4:15:02 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	59845.793	301.631	600.708	118.259	143.054	0.034
7/30/2009	4:15:59 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	115.848	141.269	0.034
7/30/2009	4:16:55 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	115.680	142.841	0.034
7/30/2009	4:17:52 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	115.298	141.452	0.034
7/30/2009	4:18:48 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	117.038	142.352	0.034
7/30/2009	4:19:45 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	113.467	141.727	0.034
7/30/2009	4:20:41 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	114.520	143.085	0.034
7/30/2009	4:21:38 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.776	60113.625	301.631	600.708	116.870	139.026	0.034
7/30/2009	4:22:34 PM	26.604	90636.070	100.000	70885.313	100.000	336.269	427.766	60113.625	301.631	600.708	112.262	143.207	0.034

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow KPPH	CT-B Cooling STM Flow KPPH	CT-A Cooling STM Flow KPPH
7/30/2009	4:23:31 PM	26.604	90636.070	99.990	70885.313	99.990	336.269	427.766	60113.625	301.631	600.708	116.931	140.918	0.034
7/30/2009	4:24:27 PM	26.193	90636.070	99.990	70885.313	99.990	336.269	427.766	60113.625	301.631	600.708	112.872	139.835	0.034
7/30/2009	4:25:24 PM	26.193	90636.070	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	117.023	138.156	0.034
7/30/2009	4:26:20 PM	26.193	90636.070	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	112.415	143.008	0.034
7/30/2009	4:27:17 PM	26.193	90636.070	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	119.617	138.904	0.034
7/30/2009	4:28:13 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	113.193	141.345	0.034
7/30/2009	4:29:10 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	115.680	142.795	0.034
7/30/2009	4:30:06 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	115.848	140.979	0.034
7/30/2009	4:31:03 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	111.758	141.223	0.034
7/30/2009	4:31:59 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	118.915	139.438	0.034
7/30/2009	4:32:56 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	112.445	139.941	0.034
7/30/2009	4:33:52 PM	26.193	90173.805	99.990	70885.313	99.990	336.269	427.766	60113.625	301.890	600.708	116.916	139.148	0.034
7/30/2009	4:34:49 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.708	116.290	140.262	0.034
7/30/2009	4:35:45 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.708	113.818	141.498	0.034
7/30/2009	4:36:42 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	119.205	140.582	0.034
7/30/2009	4:37:38 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	117.786	138.187	0.034
7/30/2009	4:38:35 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	122.379	143.176	0.034
7/30/2009	4:39:31 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	119.708	140.445	0.034
7/30/2009	4:40:28 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	115.329	142.535	0.034
7/30/2009	4:41:24 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	120.197	141.803	0.034
7/30/2009	4:42:21 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	115.070	142.093	0.034
7/30/2009	4:43:17 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	115.466	140.094	0.034
7/30/2009	4:44:14 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	118.335	141.833	0.034
7/30/2009	4:45:10 PM	26.193	90173.805	99.990	70885.313	99.990	336.587	427.766	60113.625	301.890	600.369	112.582	141.681	0.034
7/30/2009	4:46:07 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	115.421	140.125	0.034
7/30/2009	4:47:03 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	118.610	141.422	0.034
7/30/2009	4:48:00 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	116.611	141.879	0.034
7/30/2009	4:48:56 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	116.718	141.940	0.034
7/30/2009	4:49:53 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	119.846	139.987	0.034
7/30/2009	4:50:49 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	113.712	138.721	0.034
7/30/2009	4:51:46 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	117.603	142.825	0.034
7/30/2009	4:52:42 PM	26.193	90173.805	99.990	72227.453	99.990	336.587	427.766	60113.625	301.890	600.369	114.337	141.956	0.034
7/30/2009	4:53:39 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	118.259	139.301	0.034
Average		26.387	90433.829	99.995	71041.234	99.995	336.373	427.771	60017.373	301.756	600.607	115.249	141.134	0.034

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow KPPH	CT-B Cooling STM Flow KPPH	CT-A Cooling STM Flow KPPH
7/30/2009	5:02:07 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	117.130	135.593	0.034
7/30/2009	5:03:04 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	119.495	132.205	0.034
7/30/2009	5:04:00 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	113.345	129.764	0.034
7/30/2009	5:04:57 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	118.472	130.069	0.034
7/30/2009	5:05:53 PM	26.193	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	112.445	127.612	0.034
7/30/2009	5:06:50 PM	26.635	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	118.930	126.559	0.034
7/30/2009	5:07:46 PM	26.210	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	114.261	128.406	0.034
7/30/2009	5:08:43 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	118.610	124.820	0.034
7/30/2009	5:09:40 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	115.466	125.171	0.034
7/30/2009	5:10:36 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	118.198	127.551	0.034
7/30/2009	5:11:33 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	113.757	126.041	0.034
7/30/2009	5:12:29 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	60113.625	301.890	600.369	113.940	127.750	0.034
7/30/2009	5:13:26 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	116.946	123.340	0.034
7/30/2009	5:14:22 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	115.329	127.612	0.034
7/30/2009	5:15:19 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	113.742	122.699	0.034
7/30/2009	5:16:15 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	113.467	127.780	0.034
7/30/2009	5:17:12 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	115.482	122.943	0.034
7/30/2009	5:18:08 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	117.648	122.974	0.034
7/30/2009	5:19:05 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	116.565	125.949	0.034
7/30/2009	5:20:01 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	114.291	124.652	0.034
7/30/2009	5:20:58 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	115.878	125.110	0.034
7/30/2009	5:21:54 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.766	58957.523	301.890	600.369	118.350	126.620	0.034
7/30/2009	5:22:51 PM	26.232	90173.805	99.990	70936.844	99.990	336.587	427.531	58957.523	301.890	600.369	113.696	121.097	0.034
7/30/2009	5:23:47 PM	26.232	90173.805	99.976	70936.844	99.976	336.587	427.531	58957.523	301.890	600.369	116.519	126.559	0.034
7/30/2009	5:24:44 PM	26.232	90173.805	99.976	70936.844	99.976	336.587	427.531	58957.523	301.890	600.369	116.183	122.150	0.034
7/30/2009	5:25:40 PM	26.232	90173.805	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	112.689	122.424	0.034
7/30/2009	5:26:37 PM	26.232	90173.805	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	116.977	119.083	0.034
7/30/2009	5:27:33 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	118.930	119.495	0.034
7/30/2009	5:28:29 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	113.040	119.617	0.034
7/30/2009	5:29:26 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	115.894	120.975	0.034
7/30/2009	5:30:22 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	117.419	119.830	0.034

Date	Time	Fuel Gas Pressure PSIG	Fuel Gas Flow Rate SCFH	JackShaft Positioner %	Feedwater Flow Rate PPH	Master Firing Rate Demand %	Steam Drum Pressure PSIG	Steam Drum Temperature °F	Steam Flow PPH	Steam Flow Pressure PSIG	Steam Header Temperature °F	CT-C Cooling STM Flow	CT-B Cooling STM Flow	CT-A Cooling STM Flow
7/30/2009	5:31:19 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	112.872	121.463	0.034
7/30/2009	5:32:15 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	115.451	120.532	0.034
7/30/2009	5:33:12 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	116.977	123.004	0.034
7/30/2009	5:34:08 PM	26.232	89473.047	99.976	70936.844	99.976	336.587	427.531	58957.523	301.431	600.369	117.603	123.737	0.034
7/30/2009	5:35:05 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.369	117.480	121.936	0.034
7/30/2009	5:36:01 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	112.659	119.357	0.034
7/30/2009	5:36:58 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	115.222	119.617	0.034
7/30/2009	5:37:54 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	115.024	121.432	0.034
7/30/2009	5:38:51 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	117.160	123.615	0.034
7/30/2009	5:39:47 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	114.490	124.103	0.034
7/30/2009	5:40:44 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	117.755	116.916	0.034
7/30/2009	5:41:40 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	111.911	116.718	0.034
7/30/2009	5:42:37 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	115.894	117.847	0.034
7/30/2009	5:43:33 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	118.320	119.357	0.034
7/30/2009	5:44:30 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	115.817	118.365	0.034
7/30/2009	5:45:26 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	115.085	118.991	0.049
7/30/2009	5:46:23 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	116.565	118.777	0.049
7/30/2009	5:47:19 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58957.523	301.431	600.620	111.880	117.831	0.049
7/30/2009	5:48:16 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	60042.117	301.431	600.620	116.916	117.740	0.049
7/30/2009	5:49:12 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	60042.117	301.431	600.620	116.611	118.243	0.049
7/30/2009	5:50:09 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58978.504	301.431	600.620	113.651	119.266	0.049
7/30/2009	5:51:05 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58978.504	301.431	600.620	112.476	118.808	0.049
7/30/2009	5:52:02 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58978.504	301.431	600.620	115.970	117.694	0.049
7/30/2009	5:52:58 PM	26.232	89473.047	99.976	70936.844	99.976	335.927	427.531	58978.504	301.431	600.620	117.496	117.313	0.049
7/30/2009	5:53:55 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	58978.504	301.431	600.620	117.633	113.849	0.049
7/30/2009	5:54:51 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	58978.504	301.431	600.620	117.191	114.307	0.049
7/30/2009	5:55:48 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	60135.598	301.431	600.620	108.936	116.367	0.049
7/30/2009	5:56:44 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	60135.598	301.431	600.620	114.780	117.282	0.049
7/30/2009	5:57:41 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	60135.598	301.431	600.620	118.442	118.457	0.049
7/30/2009	5:58:37 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	60135.598	301.431	600.620	118.716	118.091	0.049
7/30/2009	5:59:34 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	60135.598	301.431	600.620	117.313	114.169	0.049
7/30/2009	6:00:30 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	59113.859	301.431	600.620	112.735	113.391	0.049
7/30/2009	6:01:27 PM	26.232	89473.047	99.976	70576.156	99.976	335.927	427.531	59113.859	301.431	600.620	113.773	113.712	0.049
Average		26.235	89768.679	99.981	70886.122	99.981	336.288	427.612	59307.075	301.610	600.479	115.686	121.793	0.038

**APPENDIX C**  
**CALIBRATION GAS CERTIFICATIONS**





# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/121  
Section 2.2 Procedure: G-1

Cylinder Number: CC52672

Customer: Air Hygiene  
P.O. Number: 100107  
Item Number: SGZCAH093  
Notes:

Shipping Order #: 26992885  
Transfer #: 26992885  
LOT #: LPX228158  
Valve: CGA590  
Cyl. Pressure:\* 1900psig

\*Cylinder should not be used when gas pressure is below 150 psig

Assay Date: 18-Oct-07

Expiration Date: 17-Oct-10

Component	Requested Concentration	Assay Concentration
Carbon Dioxide	6 %	6.04 ±0.04 %
Oxygen	6 %	6.03 ±0.08 %
Nitrogen	Balance	Balance

**Reference Standard(s) Employed For Analysis:**

Std name	Std #	Conc.	Units	Std. Error	Comp.	Balance	Cyl. No.	Exp. Date	Sample No.
GMIS317	GMIS317	5.01	%	0.03	CO2	N2	CC86682	1/6/2008	0
GMIS355	GMIS355	10.0	%	0.1	O2	N2	CC180358	4/14/2009	N.A.

**Analysis information:**

Component 1: Carbon Dioxide		First Triad Analysis On: 10/12/2007				Second Triad Analysis On:			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	KVB/Analect	Zero	0.31	0.31	0.28	Zero			
Model Number:	EN3024	Reference	5.58	5.80	5.83	Reference			
Serial Number:	3024	Candidate	6.73	6.67	6.87	Candidate			
Analytical Principle:	FTIR	Result	6.08	6.03	6.02	Result			
MPC Calibrated:	09/13/07	Mean Result:			6.04	Mean Result:			

Component 2: Oxygen		First Triad Analysis On: 10/18/2007				Second Triad Analysis On:			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	Servomex	Zero	0.01	0.02	0.02	Zero			
Model Number:	4605C	Reference	6.75	6.76	6.79	Reference			
Serial Number:	1101	Candidate	5.88	5.89	5.89	Candidate			
Analytical Principle:	Paramag.	Result	6.03	6.03	6.03	Result			
MPC Calibrated:	10/03/07	Mean Result:			6.03	Mean Result:			

Analyst Signature:  Ron Stitt

Calculated by:  Warren Pereira



# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/121

Section 2.2

Procedure: G-1

Cylinder Number: CC54452

Customer: AIR HYGIENE  
P.O. Number: 9021401  
Item Number: SGZCAH094  
Notes:  
File Name: 326407864E

Shipping Order #: 32650786  
Transfer #: 32640786  
LOT #: LPX249096  
Valve: CGA590  
Cyl. Pressure:\* 1900psig

Assay Date: 17-Mar-09

Expiration Date: 16-Mar-12

\*Cylinder should not be used when gas pressure is below 150 psig

Component	Requested Concentration	Assay Concentration
Carbon Dioxide	9 %	9.20 ±0.17 %
Oxygen	12 %	12.0 ±0.1 %
Nitrogen	Balance	Balance

### Reference Standard(s) Employed For Analysis:

Std name	Std #	Conc.	Units	Std. Error	Comp.	Balance	Cyl. No.	Exp. Date	Sample No.
GMIS105	GMIS105	8.02	%	0.05	CO2	N2	AL-0105	10/27/2010	N.A.
SRM128	2658a	9.397	%	0.049	O2	N2	CAL014583	7/1/2011	72-C-45

### Analysis Information:

Component 1: Carbon Dioxide		First Triad Analysis On: 3/16/2009				Second Triad Analysis On:			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	KVB/Analect	0.18	0.28	0.20					
Model Number:	EN3024	Zero				Zero			
Serial Number:	3024	Reference	7.02	7.58	7.68	Reference			
Analytical Principle:	FTIR	Candidate	8.75	8.60	8.78	Candidate			
MPC Calibrated:	02/18/09	Result	9.25	9.09	9.28	Result			
Mean Result:					9.20	Mean Result:			

Component 2: Oxygen		First Triad Analysis On: 3/17/2009				Second Triad Analysis On:			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	Servomex	0.02	0.01	0.02					
Model Number:	4605C	Zero				Zero			
Serial Number:	1101	Reference	9.30	9.31	9.31	Reference			
Analytical Principle:	Paramag.	Candidate	11.84	11.84	11.85	Candidate			
MPC Calibrated:	02/24/09	Result	11.96	11.96	11.97	Result			
Mean Result:					11.96	Mean Result:			

Analyst Signature: M. Adnane

Calculated by: M. Adnane



# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/121  
Section 2.2 Procedure: G-1

Cylinder Number: CC64302

Customer: AIR HYGIENE  
P.O. Number: 8091101  
Item Number: SGZCAH077-30AL  
Notes:  
File Name: 310158839A  
Assay Date: 13-Oct-08

Shipping Order #: 31015883  
Transfer #: 31015883  
LOT #: LPX243049  
Valve: CGA660  
Cyl. Pressure:\* 1900psig  
\*Cylinder should not be used when gas pressure is below 150 psig

Expiration Date: 13-Oct-10

Component	Requested Concentration	Assay Concentration
Nitric Oxide	27.5 ppm	28.6 ±0.4 ppm
Carbon Monoxide	27.5 ppm	30.7 ±0.4 ppm
Total NOX		28.7 ppm
Nitrogen	Balance	Balance

### Reference Standard(s) Employed For Analysis:

Std name	Std #	Conc.	Units	Std. Error	Comp.	Balance	Cyl. No.	Exp. Date	Sample No.
GMIS426	GMIS426	50.57	ppm	0.48	NO	N2	CC217252	6/26/2010	N.A.
GMIS217	GMIS217	50.2	ppm	0.6	CO	N2	CC102388	10/11/2009	N.A.

### Analysis Information:

Component 1: Nitric Oxide		First Triad Analysis On: 10/6/2008				Second Triad Analysis On: 10/13/2008			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	KVB/Analect	Zero	-0.08	-0.43	-0.11	Zero	-0.39	0.25	-0.14
Model Number:	EN3024	Reference	51.84	51.63	51.05	Reference	51.76	51.75	50.90
Serial Number:	3024	Candidate	29.37	29.26	28.74	Candidate	29.24	29.02	28.70
Analytical Principle:	FTIR	Result	28.96	28.86	28.34	Result	28.77	28.55	28.23
MPC Calibrated:	09/18/08	Mean Result:			28.72	Mean Result:			28.52
					ppm				ppm

Component 2: Carbon Monoxide		First Triad Analysis On: 10/6/2008				Second Triad Analysis On: 10/13/2008			
Analyzer Information		Trial 1	Trial 2	Trial 3	Units	Trial 1	Trial 2	Trial 3	Units
Manufacturer:	KVB/Analect	Zero	-0.08	-0.05	0.30	Zero	-0.18	-0.21	-0.21
Model Number:	EN3024	Reference	53.86	53.75	53.54	Reference	53.37	53.26	53.58
Serial Number:	3024	Candidate	32.94	33.11	33.16	Candidate	32.58	32.38	32.50
Analytical Principle:	FTIR	Result	30.76	30.92	30.97	Result	30.70	30.49	30.82
MPC Calibrated:	09/25/08	Mean Result:			30.89	Mean Result:			30.60
					ppm				ppm

Analyst Signature:  M. Adnane

Calculated by:  M. Adnane



Air Liquide America  
Specialty Gases LLC



**RATA CLASS**  
*Dual-Analyzed Calibration Standard*

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

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

Assay Laboratory

AIR LIQUIDE AMERICA SPECIALTY GASES LLC  
1290 COMBERMERE STREET  
TROY, MI 48083

P.O. No.: AIR HYGIENE

Project No.: 05-78099-008

Customer

AIR HYGIENE  
  
JOHN FALLS  
1319 N. PEORIA AVENUE  
TULSA OK 74106

**ANALYTICAL INFORMATION**

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: **ALM053740** Certification Date: **22Jul2009** Exp. Date: **22Jul2011**  
Cylinder Pressure\*\*\*: **1987 PSIG**

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	55.4	PPM	+/- 1%	Direct NIST and NMi
NITRIC OXIDE	54.6	PPM	+/- 1%	Direct NIST and NMi
NITROGEN · OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	54.6	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.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2635	02Oct2010	KAL003090	25.21 PPM	CARBON MONOXIDE
NTRM 1684	15Oct2012	KAL004432	95.84 PPM	NITRIC OXIDE

**INSTRUMENTATION**

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR/0928621	16Jul2009	FTIR
FTIR/0928621	25Jun2009	FTIR

**ANALYZER READINGS**

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

**First Triad Analysis**

**Second Triad Analysis**

**Calibration Curve**

**CARBON MONOXIDE**

Date: 15Jul2009 Response Unit: PPM  
Z1 = -0.00201 R1 = 25.05404 T1 = 54.94191  
R2 = 25.11391 Z2 = 0.01474 T2 = 55.10660  
Z3 = 0.04756 T3 = 55.13033 R3 = 25.11611  
Avg. Concentration: 55.34 PPM

Date: 22Jul2009 Response Unit: PPM  
Z1 = -0.03897 R1 = 25.00999 T1 = 55.18816  
R2 = 25.06966 Z2 = 0.01715 T2 = 55.19116  
Z3 = 0.07824 T3 = 55.19308 R3 = 25.09390  
Avg. Concentration: 55.55 PPM


Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 9.99991E-1  
Constants: A = 0.00000E+0  
B = 9.93719E-1 C = 8.63000E-4  
D = 1.00000E-6 E = 0.00000E+0

**NITRIC OXIDE**

Date: 15Jul2009 Response Unit: PPM  
Z1 = -0.11838 R1 = 95.22711 T1 = 54.19272  
R2 = 95.26434 Z2 = 0.00275 T2 = 54.54424  
Z3 = 0.20920 T3 = 54.55435 R3 = 95.39015  
Avg. Concentration: 54.73 PPM

Date: 22Jul2009 Response Unit: PPM  
Z1 = -0.06965 R1 = 95.06093 T1 = 53.81675  
R2 = 95.18361 Z2 = -0.04356 T2 = 54.06423  
Z3 = -0.04322 T3 = 54.37819 R3 = 95.25784  
Avg. Concentration: 54.49 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 9.99998E-1  
Constants: A = 0.00000E+0  
B = 9.95629E-1 C = 1.74000E-4  
D = 0.00000E+0 E = 0.00000E+0

APPROVED BY:   
Rob McCrandall



**AIR LIQUIDE**

**CERTIFICATION OF ANALYSIS**

**Interference Free Multi-Component EPA Protocol Gases**

Note: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/121  
Section 2.2, Procedure G-1

Cylinder S/N: EB0011231

Customer: AIR HYGIENE  
Location: TULSA, OK

Shipping Order Number: 33431111  
Transfer Number: 33431111  
Lot Number: SFS131864  
Valve: CGA 660  
Cylinder Pressure\*: 2000 PSIG  
\*Cylinder should not be used when  
gas pressure is below 150 psig

P.O. Number: 9042601  
Item Number: SGZCAH032

Assay Date: 21-May-2009

Expiration Date: 21-Nov-2009

Components	Requested Concentration	Assay Concentration
Nitrogen	Balance	Balance
Nitrogen Dioxide	45-50 ppm	48.0 ± 1.2 ppm

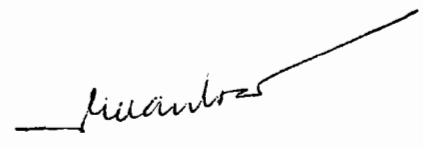
Reference Standard(s) Employed For Analysis

Certified Concentration and Uncertainty	Component	Balance	Cyl. No.	SRM/PRM/Mix No.	Exp. Date	Sample No.	Type
51.4 ± 1.2 ppm	Nitrogen Dioxide	Nitrogen	EB0009973	SFS119543	12-Jul-2010	BI	GMIS

Analytical Data

Component:	Nitrogen Dioxide	FIRST TRIAD ANALYSIS 13-May-2009			Units	SECOND TRIAD ANALYSIS 21-May-2009			Units		
		Trial 1	Trial 2	Trial 3		Trial 1	Trial 2	Trial 3			
Analyzer Information	Fourier Transform IR	Zero	-0.006	-0.012	-0.011	ppm	Zero	0.048	0.021	0.030	ppm
Manufacturer:	MKS Instruments	Reference	50.127	50.162	50.262	ppm	Reference	50.071	50.184	50.252	ppm
Model Number:	2031	Candidate	46.799	46.807	46.814	ppm	Candidate	46.904	46.907	46.888	ppm
Serial Number:	10387278	Result	47.99	47.96	47.87	ppm	Result	48.15	48.06	47.96	ppm
MPR Last Calibrated:	29-Apr-2009	Evaluation	Valid	Valid	Valid		Evaluation	Valid	Valid	Valid	
Analytical Principle:	FTIR	Mean Analytical Result:			47.94 ppm	Mean Analytical Result:			48.06 ppm		

Analyst:  Tan Ngo

Approved by:  Thuan Tran

**APPENDIX D**

**QUALITY ASSURANCE AND QUALITY CONTROL DATA**

## QA/QC PROGRAM

Air Hygiene ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA team and encompasses five major areas:

1. QA reviews of reports, laboratory work, and field testing
2. Equipment calibration and maintenance
3. Chain-of-custody
4. Training
5. Knowledge of current test methods

Each of these areas is discussed individually below.

### QA Reviews

Air Hygiene's review procedure includes review of each source test report, along with laboratory and fieldwork, by the QA Team. The most important review is the one that takes place before a test program begins. The QA Team works closely with technical division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

### Equipment Calibration and Maintenance

The equipment used to conduct the emission measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the Environmental Protection Agency. Quality control checks are also conducted in the field for each test program.

### Chain-of-Custody

Air Hygiene maintains full chain-of-custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Air Hygiene documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.). Samples are stored in a locked area to which only Air Hygiene personnel have access. Field data sheets are secured at Air Hygiene's offices upon return from the field.

### Training

Personnel's training is essential to ensure quality testing. Air Hygiene has formal and informal training programs, which include:

1. Attendance at EPA-sponsored training courses
2. Enrollment in EPA correspondence courses
3. A requirement for all technicians to read and understand Air Hygiene's QA manual
4. In-house training and QA meetings on a regular basis
5. Maintenance of training records

### Knowledge of Current Test Methods

With the constant updating of standard test methods and the wide variety of emerging test procedures, it is essential that any qualified source tester keep abreast of new developments. Air Hygiene subscribes to services, which provide updates on EPA reference methods, rules, and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. Air Hygiene personnel maintain membership in the Air and Waste Management Association and the American Industrial Hygiene Association.

## COMBUSTION TESTING QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities were undertaken before, during, and after this testing project. This section of the report combined with the documentation in Appendix C describes each of those activities.

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 adjusting its 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 plus or minus two percent of the range of predicted values. NO<sub>2</sub> to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO<sub>2</sub> in a balance of nitrogen. Conversion was verified to be between 90 and 110 percent.

After each test run, the analyzers were checked for zero and span drift. This allowed each test run to be bracketed by calibrations and documents the precision of the data just collected. The criterion for acceptable data is that the instrument drift is no more than three percent of the full-scale response. The quality assurance worksheets in the following pages summarize all multipoint calibration checks and zero to span checks performed during the tests. These worksheets (as prepared from the data records of Appendix A) show that no drifts in excess of three percent occurred in the zero to span checks following each test run.

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

The absence of leaks in the sampling system was also verified by a sampling system bias check. The sampling system's integrity was tested by comparing the responses of the analyzers to the calibration gases introduced via two paths. The first path was directly into the analyzer and the second path via the sample system at the sample probe. Any difference in the instrument responses by these two methods was attributed to sampling system bias or leakage. The criterion for acceptance is agreement within five percent of the span of the analyzer.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to plus or minus one percent accuracy for all gases. EPA Protocol No. 1 was used, where applicable to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM's). The gas calibration sheets as prepared by the vendor are contained in Appendix C.

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

### INSTRUMENTAL ANALYSIS QUALITY ASSURANCE DATA

Date: July 30, 2009  
Company: Florida Power and Light  
Location: Loxahatchee, Florida  
Techs: JF/AH

#### Sample System Leak Check

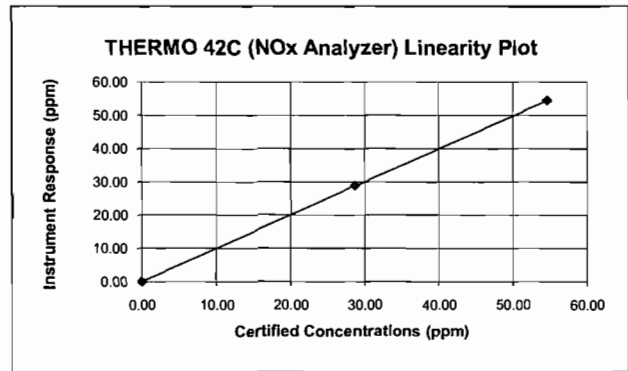
Date	Sample System	Leak Rate (l/min)
July 30, 2009	1	0



Calibration Date: July 30, 2009  
 Client: Florida Power and Light

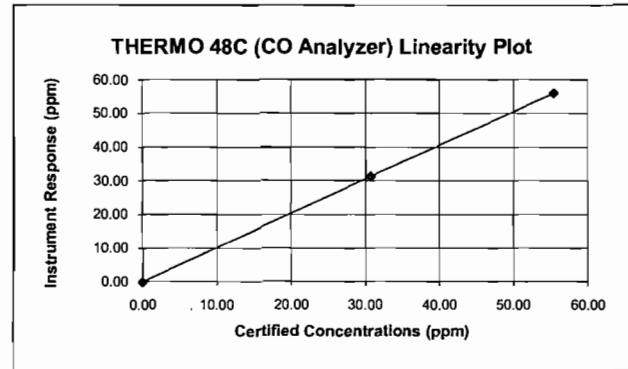
NOx Span (ppm) = 54.60

THERMO 42C (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.05	0.09	0.05	YES (%)
28.70	28.90	0.37	0.20	YES (%)
54.60	54.45	-0.27	0.15	YES (%)
Linearity = 1.003				



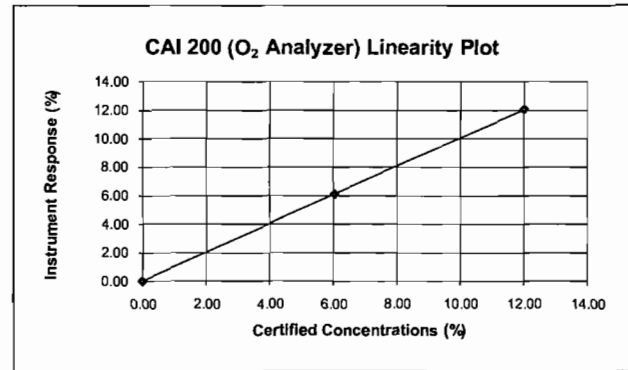
CO Span (ppm) = 55.40

THERMO 48C (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.03	0.05	0.03	YES (%)
30.70	31.30	1.08	0.60	YES (%)
55.40	55.81	0.74	0.41	YES (%)
Linearity = 0.993				



O<sub>2</sub> Span (%) = 12.00

CAI 200 (O <sub>2</sub> Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.05	0.42	0.05	YES (%)
6.03	6.12	0.75	0.09	YES (%)
12.00	12.06	0.50	0.06	YES (%)
Linearity = 0.999				



## NOx Converter Efficiency

Date: July 30, 2009

Analyzer: INST-NX-0010

RM 7E, (08-15-06), 8.2.4.1 Introduce a concentration of 40 to 60 ppmv NO<sub>2</sub> to the analyzer in direct calibration mode and record the NOx concentration displayed by the analyzer. ... Calculate the converter efficiency using Equation 7E-7 in Section 12.7. The specification for converter efficiency in Section 13.5 must be met. ... The NO<sub>2</sub> must be prepared according to the EPA Traceability Protocol and have an accuracy within 2.0 percent.

**Audit Gas:** NO<sub>2</sub> Concentration (C<sub>v</sub>), ppmvd **48.00**

### Converter Efficiency Calculations:

Analyzer Reading, NO Channel, ppmvd	<b>1.41</b>
Analyzer Reading, NOx Channel, ppmvd	<b>49.33</b>
Analyzer Reading, NO <sub>2</sub> Channel (C <sub>Dir(NO<sub>2</sub>)</sub> ), ppmvd	<b>47.92</b>
Converter Efficiency, %	<b>99.83</b>

RM 7E, (08-15-06), 13.5 NO<sub>2</sub> to NO Conversion Efficiency Test (as applicable). The NO<sub>2</sub> to NO conversion efficiency, calculated according to Equation 7E-7 or Equation 7E-9, must be greater than or equal to 90 percent.

$$Eff_{NO_2} = \left( \frac{C_{Dir}}{C_v} \right) \times 100 \quad \text{Eq. 7E-7} = \frac{47.92 \text{ ppmvd}}{48.00 \text{ ppmvd}} \times 100 = 99.83\%$$

Date/Time	Elapsed Time	NOx	NO
mm/dd/yy hh:mm:ss	Seconds	ppmvd	ppmvd
07/30/09 09:24:55	3249	49.21	1.56
07/30/09 09:25:25	3279	49.25	1.47
07/30/09 09:25:55	3309	49.25	1.41
07/30/09 09:26:25	3339	49.33	1.41

DRIFT AND BIAS CHECK		
Strat Test Pre and Post QA/QC Check	O2	NOx
Initial Zero	0.10	0.31
Final Zero	0.03	0.36
Avg. Zero	0.07	0.34
Initial UpScale	6.09	28.11
Final UpScale	6.02	27.81
Avg. UpScale	6.06	27.96
Sys Resp (Zero)	0.05	0.05
Sys Resp (Upscale)	6.12	28.90
Upscale Cal Gas	6.03	28.70
Initial Zero Bias	0.42%	0.48%
Final Zero Bias	-0.17%	0.57%
Zero Drift	0.58%	0.09%
Initial Upscale Bias	-0.25%	-1.45%
Final Upscale Bias	-0.83%	-2.00%
Upscale Drift	0.58%	0.55%
Alternative Specification Abs Diff		
Initial Zero	0.05	0.26
Final Zero	0.02	0.31
Initial Upscale	0.03	0.79
Final Upscale	0.10	1.09
Calibration Span	12.00	54.60
3% of Range (drift)	0.36	1.64
5% of Range (bias)	0.60	2.73

Response Time (min)	0.5	1.3
Sys. Response (min)	1.3	

Date/Time mm/dd/yy hh:mm:ss	O2 %	NOx ppm
07/30/09 09:38:05	5.40	31.36
07/30/09 09:38:15	5.47	31.49
07/30/09 09:38:25	5.42	31.54
07/30/09 09:38:35	3.93	31.53
07/30/09 09:38:45	5.67	31.53
07/30/09 09:38:55	6.07	32.62
07/30/09 09:39:05	6.08	24.09
07/30/09 09:39:15	6.08	10.19
07/30/09 09:39:25	6.08	4.24
07/30/09 09:39:35	6.08	1.82
07/30/09 09:39:45	6.09	0.97
07/30/09 09:39:55	6.08	0.78
07/30/09 09:40:05	6.08	0.69
07/30/09 09:40:15	6.07	0.59
07/30/09 09:40:25	6.08	0.57
07/30/09 09:40:35	6.08	0.53
07/30/09 09:40:45	6.08	0.45
07/30/09 09:40:55	6.08	0.43
07/30/09 09:41:05	6.08	0.42
07/30/09 09:41:15	6.07	0.39
07/30/09 09:41:25	6.08	0.38
07/30/09 09:41:35	6.07	0.37
07/30/09 09:41:45	6.07	0.33
07/30/09 09:41:55	6.07	0.32
07/30/09 09:42:05	6.08	0.32
07/30/09 09:42:15	6.08	0.32
07/30/09 09:42:25	5.87	0.32
07/30/09 09:42:35	1.15	0.31
07/30/09 09:42:45	0.17	4.51
07/30/09 09:42:55	0.14	9.46
07/30/09 09:43:05	0.13	15.89
07/30/09 09:43:15	0.12	24.24
07/30/09 09:43:25	0.12	27.18
07/30/09 09:43:35	0.12	27.65
07/30/09 09:43:45	0.11	27.86
07/30/09 09:43:55	0.10	27.93
07/30/09 09:44:05	0.11	28.00
07/30/09 09:44:15	0.11	28.11
07/30/09 09:44:25	0.11	28.11
07/30/09 09:44:35	0.11	28.11
07/30/09 09:44:45	0.11	28.17

INJECTIONS

<b>DRIFT AND BIAS CHECK</b>			
<b>Full Load, Run - 1-1</b>	<b>O<sub>2</sub></b>	<b>NOx</b>	<b>CO</b>
Raw Average	5.62	32.27	0.07
Corrected Average	5.63	33.52	0.28
Initial Zero	0.02	0.38	-0.18
Final Zero	0.01	0.38	-0.24
Avg. Zero	0.02	0.38	-0.21
Initial UpScale	6.01	27.75	31.02
Final UpScale	6.01	27.61	30.81
Avg. UpScale	6.01	27.68	30.92
Sys Resp (Zero)	0.05	0.05	0.03
Sys Resp (Upscale)	6.12	28.90	31.30
Upscale Cal Gas	6.03	28.70	30.70
Initial Zero Bias	-0.25%	0.60%	-0.38%
Final Zero Bias	-0.33%	0.60%	-0.49%
Zero Drift	0.08%	0.00%	0.11%
Initial Upscale Bias	-0.92%	-2.11%	-0.51%
Final Upscale Bias	-0.92%	-2.36%	-0.88%
Upscale Drift	0.00%	0.26%	0.38%
Alternative Specification Abs Diff	Initial Zero	0.03	0.33
	Final Zero	0.04	0.33
	Initial Upscale	0.11	1.15
	Final Upscale	0.11	1.29
Calibration Span	12.00	54.60	55.40
3% of Cal. Span (drift)	0.36	1.64	1.66
5% of Cal. Span (bias)	0.60	2.73	2.77

<b>DRIFT AND BIAS CHECK</b>			
<b>Full Load, Run - 1-2</b>	<b>O<sub>2</sub></b>	<b>NOx</b>	<b>CO</b>
Raw Average	5.48	32.33	0.08
Corrected Average	5.51	33.68	0.30
Initial Zero	0.01	0.38	-0.24
Final Zero	0.02	0.42	-0.21
Avg. Zero	0.02	0.40	-0.23
Initial UpScale	6.01	27.61	30.81
Final UpScale	6.00	27.61	30.97
Avg. UpScale	6.01	27.61	30.89
Sys Resp (Zero)	0.05	0.05	0.03
Sys Resp (Upscale)	6.12	28.90	31.30
Upscale Cal Gas	6.03	28.70	30.70
Initial Zero Bias	-0.33%	0.60%	-0.49%
Final Zero Bias	-0.25%	0.68%	-0.43%
Zero Drift	0.08%	0.07%	0.05%
Initial Upscale Bias	-0.92%	-2.36%	-0.88%
Final Upscale Bias	-1.00%	-2.36%	-0.60%
Upscale Drift	0.08%	0.00%	0.29%
Alternative Specification Abs Diff	Initial Zero	0.04	0.33
	Final Zero	0.03	0.37
	Initial Upscale	0.11	1.29
	Final Upscale	0.12	1.29
Calibration Span	12.00	54.60	55.40
3% of Cal. Span (drift)	0.36	1.64	1.66
5% of Cal. Span (bias)	0.60	2.73	2.77

<b>DRIFT AND BIAS CHECK</b>			
<b>Full Load, Run - 1-3</b>	<b>O<sub>2</sub></b>	<b>NO<sub>x</sub></b>	<b>CO</b>
Raw Average	5.61	31.61	0.08
Corrected Average	5.65	32.87	0.29
Initial Zero	0.02	0.42	-0.21
Final Zero	0.01	0.49	-0.22
Avg. Zero	0.02	0.46	-0.22
Initial UpScale	6.00	27.61	30.97
Final UpScale	5.99	27.70	30.91
Avg. UpScale	6.00	27.66	30.94
Sys Resp (Zero)	0.05	0.05	0.03
Sys Resp (Upscale)	6.12	28.90	31.30
Upscale Cal Gas	6.03	28.70	30.70
Initial Zero Bias	-0.25%	0.68%	-0.43%
Final Zero Bias	-0.33%	0.81%	-0.45%
Zero Drift	0.08%	0.13%	0.02%
Initial Upscale Bias	-1.00%	-2.36%	-0.60%
Final Upscale Bias	-1.08%	-2.20%	-0.70%
Upscale Drift	0.08%	0.16%	0.11%
Alternative Specification Abs Diff	Initial Zero	0.03	0.37
	Final Zero	0.04	0.44
	Initial Upscale	0.12	1.29
	Final Upscale	0.13	1.20
Calibration Span	12.00	54.60	55.40
3% of Cal. Span (drift)	0.36	1.64	1.66
5% of Cal. Span (bias)	0.60	2.73	2.77

**APPENDIX E**  
**FUEL ANALYSIS RECORDS**

**Client:** Florida Power and Light  
**Location:** West County Energy Center  
**Date:** July 30, 2009  
**Project #:** bv-09-westcounty.fl-comp#1

**Natural Gas - Fuel Analysis**

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular <sup>1</sup> Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross <sup>1,3</sup> Heating Value (Btu/ft <sup>3</sup> )	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net <sup>1,3</sup> Heating Value (Btu/ft <sup>3</sup> )	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH <sub>4</sub>	96.896	16.0430	15.55	93.36	994.85	963.97	895.75	867.95
Ethane	C <sub>2</sub> H <sub>6</sub>	1.433	30.0700	0.43	2.59	1,743.15	24.98	1,594.41	22.85
Propane	C <sub>3</sub> H <sub>8</sub>	0.187	44.0970	0.08	0.50	2,478.35	4.63	2,280.17	4.26
iso-Butane	iC <sub>4</sub> H <sub>10</sub>	0.022	58.1230	0.01	0.08	3,203.11	0.70	2,955.38	0.65
n-Butane	nC <sub>4</sub> H <sub>10</sub>	0.029	58.1230	0.02	0.10	3,213.35	0.93	2,965.62	0.86
Iso-Pentane	iC <sub>5</sub> H <sub>12</sub>	0.006	72.1500	0.00	0.03	3,940.87	0.24	3,643.50	0.22
n-Pentane	nC <sub>5</sub> H <sub>12</sub>	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C <sub>6</sub> H <sub>14</sub>	0.024	86.1770	0.02	0.12	4,684.54	1.12	4,337.82	1.04
Heptanes	C <sub>7</sub> H <sub>16</sub>	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C <sub>8</sub> H <sub>18</sub>	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO <sub>2</sub>	0.906	44.0100	0.40	2.39	0.00	0.00	0.00	0.00
Nitrogen	N <sub>2</sub>	0.497	28.0134	0.14	0.84	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H <sub>2</sub> S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O <sub>2</sub>	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H <sub>2</sub>	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		100.000		16.65	100.00	dry	996.58	dry	897.83
						wet <sup>2,5</sup>	973.60	wet <sup>2,5</sup>	877.13

Characteristics of Fuel Gas	
Molecular Weight of gas =	16.651 lb/lb-mole
Btu per lb. of gas <sup>4</sup> =	23,056.332 gross (HHV)
Btu per lb. of gas <sup>4</sup> =	20,771.834 net (LHV)
Density of fuel gas <sup>2</sup> =	0.0432 lb/cu. ft
Wt % VOC in fuel gas =	0.82 %
Specific Gravity <sup>1</sup> =	0.5749

Component	Wt%
carbon	73.29
oxygen	1.74
hydrogen	24.13
nitrogen	0.84
helium	0.00
sulfur	0.00
<b>Total</b>	<b>100.00</b>

**F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,643.47**  
 (Based on EPA RM-19) at 68 deg F and 14.696 psia

**F-Factor Calculation:**

$$F\text{-Factor} = 1,000,000 * ((3.64 * \%H) + (1.53 * \%C) + (0.57 * \%S) + (0.14 * \%N) - (0.46 * \%O)) / GCV$$

GCV = Gross Btu per lb. of gas (HHV)

%H, %C, %S, %N, & %O are percent weight values calculated from fuel analysis and have units of (scf/lb)/%

Density of natural gas based on specific gravity multiplied by density of air at 68 deg F and 14.696 psia.

**References:**

- <sup>1</sup> ASTM D 3588
- <sup>2</sup> Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg
- <sup>3</sup> Mark's Standard Handbook for Mechanical Engineers, 10th ed. - Eugene A. Avallone, Theodore Baumeister III
- <sup>4</sup> Introduction to Fluid Mechanics, 3rd ed. - William S. Janna
- <sup>5</sup> GPA Reference Bulletin 181-86, revised 1986, reprinted 1995



HOUSTON LABORATORIES  
 8820 INTERCHANGE DRIVE  
 HOUSTON, TEXAS 77054  
 PHONE (713) 660-0901

# Certificate of Analysis

Number: 1030-2009080101-001A

Jake Fahlenkamp  
 Air Hygiene  
 5634 S. 122nd East Ave.  
 Suite F  
 Tulsa OK 74146

August 07, 2009

Sample ID:		Sampled By:	JRF
Station Name :	Auxillary Boiler Gas Supply	Sample Of:	Gas
Station Number :	105	Sample Date:	07/30/2009
Station Location :	Tulsa, Oklahoma	Sample Conditions:	N.G. Pres. , N.G. Temp.
Sample Point:		PO / Ref. No:	

## ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	8/6/2009
Nitrogen	0.497	0.836				
Carbon Dioxide	0.906	2.395				
Methane	96.896	93.348				
Ethane	1.433	2.588	0.382			
Propane	0.187	0.495	0.051			
Iso Butane	0.022	0.077	0.007			
n-Butane	0.029	0.101	0.009			
Iso Pentane	0.006	0.026	0.002			
Hexanes Plus	0.024	0.134	0.011			
	<u>100.000</u>	<u>100.000</u>	<u>0.462</u>			
GPM TOTAL :	<b>C2 +</b> 0.462	<b>C3 +</b> 0.080	<b>IC5 +</b> 0.013			
Relative Density	Real Gas			0.5760		
Calculated Molecular Weight				16.65		
Compressibility Factor				0.9979		
Calculated Gross BTU per ft <sup>3</sup> @14.696 psia & 60°F						
Real Gas	Dry Basis	1014				
	Saturated Basis	996				

**Comments :**

Cylinder Number 386

Hydrocarbon Laboratory Manager

**Quality Assurance:**

The above analyses are performed in accordance with ASTM, UOP or GPA guidelines for quality assurance, unless otherwise stated





**HOUSTON LABORATORIES**  
 8820 INTERCHANGE DRIVE  
 HOUSTON, TEXAS 77054  
 PHONE (713) 660-0901

## Certificate of Analysis

Number: 1030-2009080101-001A

Jake Fahlenkamp  
 Air Hygiene  
 5634 S. 122nd East Ave.  
 Suite F  
 Tulsa OK 74146

August 07, 2009

Sample ID:		Sampled By:	JRF
Station Name:	Auxiliary Boiler Gas Supply	Sample Of:	Gas
Station Number :	105	Sample Date:	07/30/2009
Location:	Tulsa, Oklahoma	Sample Condition:	
Sample Point:		PO / Ref. No:	

### ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	<1.0	PPMW	1.0	EM	08/07/09
Total Sulfur By UV	ASTM-D-6667	<0.0001	Wt%.		EM	08/07/09
Total Sulfur By UV	ASTM-D-6667	<0.032	gr/100 cu.ft.		EM	08/07/09

Comments: Cylinder Number: 386

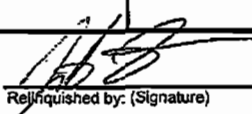
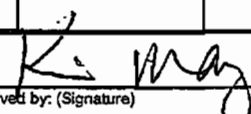
Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP or GPA guidelines for quality assurance, unless otherwise stated.

# SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD



Air Hygiene International, Inc.  
 5634 S. 122nd East Ave, Suite F  
 Tulsa, Oklahoma 74146  
 (888) 461-8778  
 www.airhygiene.com

Project Number:		bv-09-westcounty.fl-comp#1		Laboratory Analysis Requested:			
Person Taking Samples:		JRF		GPA 2261 and ASTM D 6667			
Sample Number	Location	Date	Volume	Analysis Method			
				2261	6667		
386	Aux Boiler Supply	7/30/2009		x	x		
	email to: jake@airhygiene.com						
	sulfur report as grs/100 dscf						
 Relinquished by: (Signature)		8/3/09 Date:	10:30 am Time:	 Received by: (Signature)		8/6/09 Date:	_____ Time:
Relinquished by: (Signature)		Date:	Time:	Received by: (Signature)		Date:	Time:

**APPENDIX F**  
**STRATIFICATION TEST DATA**

Source Information	
<b>Company</b>	Florida Power and Light
<b>Plant Name</b>	West County Energy Center
<b>Equipment</b>	Auxiliary Boiler
<b>Location</b>	Loxahatchee, Florida

Test Information	
<b>Date</b>	07/30/09
<b>Project #</b>	bv-09-westcounty.fl-comp#1
<b>Unit Number</b>	Auxiliary Boiler
<b>Load</b>	Maximum Available
<b>Number of Ports Available</b>	4
<b>Number of Ports Used</b>	2

Stack and Test Type	
<input type="radio"/> Isokinetic Traverse (Wet Chemistry Testing) <input type="radio"/> Velocity Traverse (Flow and Flow RATA Test) <input checked="" type="radio"/> <b>Stratification Traverse (Compliance Test)</b> <input type="checkbox"/> RM 20 <input type="radio"/> Stratification Traverse (RATA) <input type="checkbox"/> Part 60 <input type="checkbox"/> Part 75	<b>Circular Stack</b>

**METHOD 1 - STRATIFICATION TEST FOR A CIRCULAR SOURCE**

<b>Company</b>	Florida Power and Light	<b>Date</b>	07/30/09
<b>Plant Name</b>	West County Energy Center	<b>Project #</b>	bv-09-westcounty.fl-comp#1
<b>Equipment</b>	Auxiliary Boiler	<b># of Ports Available</b>	4
<b>Location</b>	Loxahatchee, Florida	<b># of Ports Used</b>	2

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L <sub>fw</sub> )	76.00	in.
Distance to Near Wall of Stack	(L <sub>nw</sub> )	10.00	in.*
Diameter of Stack	(D)	66.00	in.
Area of Stack	(A <sub>s</sub> )	23.76	ft <sup>2</sup>

\*assume 10 in. reference (must be measured and verified in field)

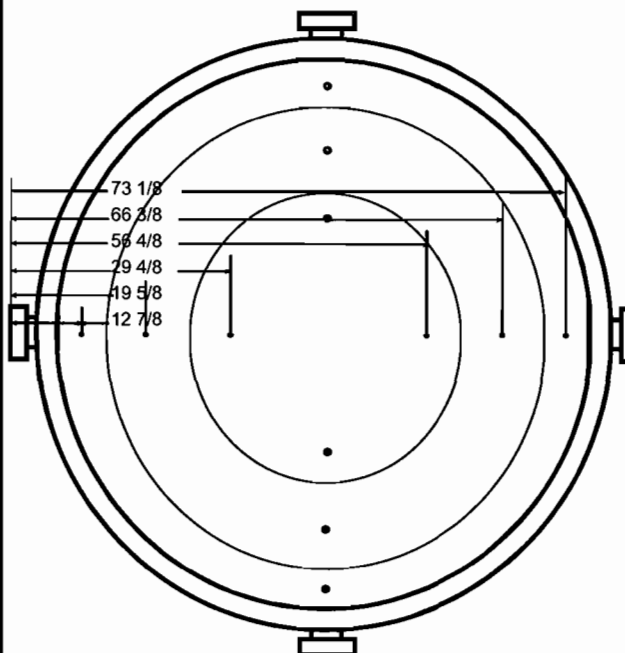
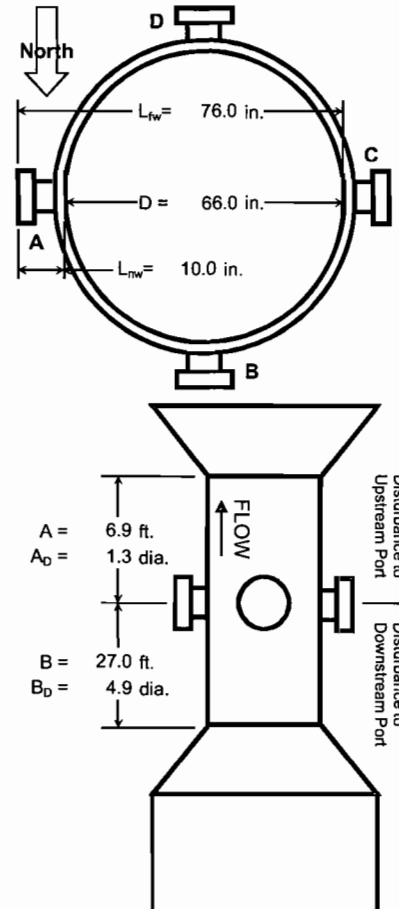
Distance from Disturbances to Port			
Distance Upstream	(A)	82.50	in.
Diameters Upstream	(A <sub>D</sub> )	1.25	diameters
Distance Downstream	(B)	324.00	in.
Diameters Downstream	(B <sub>D</sub> )	4.91	diameters

Number of Traverse Points Required					
Diameters to Flow Disturbance		Minimum Number of <sup>1</sup> Traverse Points		Minimum Number of Traverse Points	
Down (B <sub>D</sub> )	Up (A <sub>D</sub> )	Particulate	Velocity	Comp Stratification	
Stream	Stream	Points	Points	Criteria	Points
2.00-4.99	0.50-1.24	24	16	● RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	○ Air 7E 8.1.2	3 points
6.00-6.99	1.50-1.74	16	12		12 points
7.00-7.99	1.75-1.99	12	12		
>= 8.00	>=2.00	8 or 12 <sup>2</sup>	8 or 12 <sup>2</sup>		Minimum Number of
Upstream Spec		20	16		Traverse Points
Downstream Spec		24	16		RATA Stratification
Traverse Pts Required		24	16	Criteria	Points
				○ Part75/60	12 RM1 pts
				○ 75 abrv (a)	3 points
				○ 75 abrv (b)	6 points

<sup>1</sup> Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.  
<sup>2</sup> 8 for Circular Stacks 12 to 24 inches  
 12 for Circular Stacks over 24 inches

Number of Traverse Points Used				
2	Ports by	6	Pts / port	Stratification Traverse
12	Pts Used	12	Required	(Compliance Test)

Traverse Point Locations			
Traverse Point Number	Percent of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length
	%	in.	in.
1	4.4%	2 7/8	12 7/8
2	14.6%	9 5/8	19 5/8
3	29.6%	19 4/8	29 4/8
4	70.4%	46 4/8	56 4/8
5	85.4%	56 3/8	66 3/8
6	95.6%	63 1/8	73 1/8
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



**STRATIFICATION TRAVERSE (COMPLIANCE TEST) RESULTS**

<b>Company</b>	Florida Power and Light	<b>Date</b>	07/30/09
<b>Plant Name</b>	West County Energy Center	<b>Project #</b>	bv-09-westcounty.fl-comp#1
<b>Equipment</b>	Auxiliary Boiler	<b># of Ports Available</b>	4
<b>Location</b>	Loxahatchee, Florida	<b># of Ports Used</b>	2

Stack Dimensions				Traverse Data			
<b>Diameter or Length of Stack</b>	(D)	66.00	in.	2	<b>Ports by</b>	6	<b>Pts / port</b>
<b>Width of Stack</b>	(W)		in.	12	<b>Pts Used</b>	12	<b>Required</b>
<b>Area of Stack</b>	(A <sub>s</sub> )	23.76	ft <sup>2</sup>	<b>Run Start</b>	10:00:05	<b>Run End</b>	10:39:05

Traverse Point	Time Per Point	Point Start Time	Point Stop Time (Reading)	O2	Percent Difference	NOx	Percent Difference
	min.	hh:mm:ss	hh:mm:ss	%	%	ppm	%
B-6	3.00	10:00:05	10:03:05	5.40	1.39%	31.93	1.22%
B-5	3.00	10:03:05	10:06:05	5.39	1.20%	31.96	1.31%
B-4	3.00	10:06:05	10:09:05	5.38	1.02%	31.75	0.65%
B-3	3.00	10:09:05	10:12:05	5.26	1.24%	31.74	0.62%
B-2	3.00	10:12:05	10:15:05	5.26	1.24%	31.60	0.17%
B-1	3.00	10:15:05	10:18:05	5.22	1.99%	31.21	1.06%
A-6	6.00	10:18:05	10:24:05	5.46	<b>2.52%</b>	31.34	0.65%
A-5	3.00	10:24:05	10:27:05	5.41	1.58%	31.51	0.11%
A-4	3.00	10:27:05	10:30:05	5.36	0.64%	31.53	0.05%
A-3	3.00	10:30:05	10:33:05	5.21	2.17%	31.33	0.68%
A-2	3.00	10:33:05	10:36:05	5.27	1.05%	31.11	<b>1.38%</b>
A-1	3.00	10:36:05	10:39:05	5.29	0.67%	31.54	0.02%
<b>Average</b>				5.33		31.55	

**STRAT TEST DETERMINED SAMPLE POINTS FOR CIRCULAR STACK**

<b>Company</b>	Florida Power and Light	<b>Date</b>	07/30/09
<b>Plant Name</b>	West County Energy Center	<b>Project #</b>	bv-09-westcounty.fl-comp#1
<b>Equipment</b>	Auxiliary Boiler	<b># of Ports Available</b>	4
<b>Location</b>	Loxahatchee, Florida	<b># of Ports Used</b>	2

Stack Dimensions				Traverse Data			
<b>Diameter or Length of Stack</b>	(D)	66.00	in.	2	<b>Ports by</b>	6	<b>Pts / port</b>
<b>Width of Stack</b>	(W)		in.	12	<b>Pts Used</b>	12	<b>Required</b>
<b>Area of Stack</b>	(A <sub>s</sub> )	23.76	ft <sup>2</sup>	<b>Run Start</b>	10:00:05	<b>Run End</b>	10:39:05

40 CFR 60, Appendix A, Method 7E Criteria												
Stratification Results		Traverse Point Number	Percent of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length							
<b>Maximum Percent Difference</b>	2.52 % for O <sub>2</sub>											
<b>Maximum Pollutant Conc. Diff.</b>	0.44 ppm for NO <sub>x</sub>											
<b>Maximum Diluent Conc. Diff.</b>	0.13 % for O <sub>2</sub>											
<b>Stack Diameter</b>	66.00 in.		%	in.	in.							
Stratification Conclusions		1										
<b>Maximum % Diff.</b>	Percent Diff. ≤5% Passed 8.1.2 Single Pt. Criteria	2										
<b>Maximum Conc. Diff.</b>	Conc. Diff. ≤ 0.5% Passed 3A 8.1 Three Pt. Criteria	3										
<b>Stack Diameter</b>	D ≤ 93.6 in.											
Passed Strat. Test Under RM 7E 8.1.2 Single Pt. Criteria Sample from the point that most closely matches the average		<table border="0"> <tr> <td rowspan="3">Test Type</td> <td><input type="checkbox"/> Moisture, for MW</td> <td><input type="checkbox"/> Use 6.5.6.3(a) points?</td> </tr> <tr> <td><input type="checkbox"/> Moisture, for wet-to-dry</td> <td><input type="checkbox"/> 6.5.6(b)(2) alt. points do not apply</td> </tr> <tr> <td><input checked="" type="checkbox"/> Gas</td> <td></td> </tr> </table>				Test Type	<input type="checkbox"/> Moisture, for MW	<input type="checkbox"/> Use 6.5.6.3(a) points?	<input type="checkbox"/> Moisture, for wet-to-dry	<input type="checkbox"/> 6.5.6(b)(2) alt. points do not apply	<input checked="" type="checkbox"/> Gas	
Test Type	<input type="checkbox"/> Moisture, for MW	<input type="checkbox"/> Use 6.5.6.3(a) points?										
	<input type="checkbox"/> Moisture, for wet-to-dry	<input type="checkbox"/> 6.5.6(b)(2) alt. points do not apply										
	<input checked="" type="checkbox"/> Gas											

