



AIR HYGIENE, INC.

Testing Solutions for a Better World

**EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT #1B
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
DECEMBER 19 AND 20, 2010**



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

WCPP Project 144553
WCPP Files 14.0100/32.0440
WCPP-2011-TP-689
January 27, 2011

E-mail, Express Mail

Ms. Elizabeth Walker
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

RECEIVED

JAN 28 2011

BUREAU OF
AIR REGULATION

Subject: **West County Unit 1B Fuel Oil Emissions Test Report**

Dear Ms. Walker:

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 1 at the FPL West County Energy Center, is submitting the Unit 1B Fuel Oil Emissions Test Report per the requirements of 40 CFR Part 60 and West County's Air Permit, Records and Reports, #31 (Permit No. PSD-FL-354).

If you have any questions about this notification, please contact Terry Apple at (913) 458-7220.

Very truly yours,

WEST COUNTY POWER PARTNERS, LLC

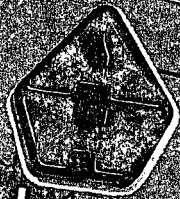

Mike Perkins
Project Executive

WS:hs

enclosures: 1 hard copy, 1 CD

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Air Hygiene International, Inc.

EMISSION
COMPLIANCE
TEST

MITSUBISHI
501G,
UNIT 1B

FLORIDA POWER AND LIGHT
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
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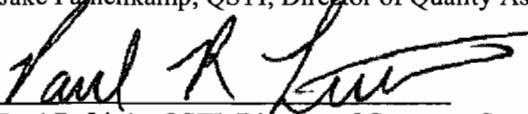
JAN 28 2011

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Prepared and Reviewed by:


Jake Fahlenkamp, QSTI, Director of Quality Assurance


S. Mukund Venkitachalam, Test Technician


Paul R. Little, QSTI, Director of Customer Service

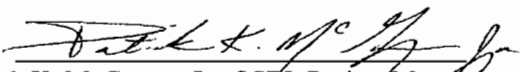

Patrick K. McGovern Jr., QSTI, Project Manager

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**Emissions Compliance Test
Mitsubishi, Model 501G, Unit #1B
Florida Power and Light
West County Energy Center
Loxahatchee, Florida
December 19 and 20, 2010**

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), ammonia (NH₃), opacity, carbon dioxide (CO₂), and oxygen (O₂) from the exhaust of the Mitsubishi, Model 501G, Unit #1B 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 December 19 and 20, 2010.

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 one test load (Base Load firing Fuel Oil). 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_x, CO, VOC, NH₃, opacity, CO₂, and O₂ from the exhaust of Florida Power and Light's Mitsubishi, Model 501G, Unit #1B at Base Load firing Fuel Oil.

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)
 - Florida Power and Light
 - Black and Veatch
 - Air Hygiene
- 1.2.2 Industry
 - Electric Utility / Electric Services
- 1.2.3 Air Permit
 - Permit Number: PSD-FL-354
 - Emission Unit Identification (ID): 002
- 1.2.4 Plant Location
 - West County Energy Center near Loxahatchee, Florida
- 1.2.5 Equipment Tested
 - Mitsubishi, Model 501G, Unit #1B

1.2.6 Emission Points

- Exhaust from the Mitsubishi, Model 501G, Unit #1B
- For all gases, three sample points in the exhaust duct from the Mitsubishi, Model 501G, Unit #1B, determined after conducting a stratification test (refer to Appendix F)
- For all NH₃ testing, 24 sampling points in the exhaust duct from the Mitsubishi, Model 501G, Unit #1B (refer to Appendix A)
- For opacity, one sample visual observation point from the exit of the exhaust duct to the atmosphere from the Mitsubishi, Model 501G, Unit #1B

1.2.7 Pollutants Measured

- NO_x
- CO
- VOC
- NH₃
- Opacity
- CO₂
- O₂

1.2.8 Dates of Emission Test

- December 19 and 20, 2010

1.3 KEY PERSONNEL

Florida Power and Light:	David Fawcett	561-904-4907
Florida Power and Light:	Emmett Callow	561-904-4922
Black and Veatch:	Bill Stevenson	913-458-8549
Palm Beach County Health Department:	Binod Basnet	561-837-5974
Air Hygiene:	Jake Fahlenkamp	918-307-8865
Air Hygiene:	Mukund Venkitachalam	918-307-8865
Air Hygiene:	Albert Septiano	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Florida Power and Light's Mitsubishi, Model 501G, Unit #1B located at the West County Energy Center on December 19 and 20, 2010 are summarized in the following table.

**TABLE 2.1
SUMMARY OF MITSUBISHI, 501G, UNIT #1B RESULTS**

Parameter	Fuel Oil Load	Permit Limits
Run Duration (min / run)	60	--
Bar. Pressure (in. Hg)	29.93	--
Amb. Temp. (°F)	67	--
Rel. Humidity (%)	59	--
Spec. Humidity (lb water / lb air)	0.008150	--
Load Designator	Fuel Oil	--
Turbine Fuel Flow (gal/hr)	16,482	--
Total Fuel Flow (SCFH)	2,203	--
Stack Flow (RM19) (SCFH)	57,320,646	--
Stack Moisture (% Method 4)	8.3	--
Power Output (megawatts)	231.9	--
NOx (ppmvd)	8.74	--
NOx (ppm@15%O ₂)	6.90	8.00
NOx (ppm@15%O ₂ &ISO)	6.94	--
NOx (lb/hr)	60.25	82.40
NOx (ton/year) at 500 hr/year	15.06	--
NOx (lb/MMBtu)	0.027	--
CO (ppmvd)	9.80	--
CO (ppm@15%O ₂)	7.74	8.00
CO (ppm@15%O ₂ &ISO)	7.82	--
CO (lb/hr)	41.08	42.00
CO (ton/year) at 500 hr/year	10.27	--
CO (lb/MMBtu)	0.018	--
VOC (ppmvd)	0.08	--
VOC (ppm@15%O ₂)	0.06	6.00
VOC (ppm@15%O ₂ &ISO)	0.06	--
VOC (lb/hr)	0.18	19.60
VOC (ton/year) at 500 hr/year	0.05	--
VOC (lb/MMBtu)	0.000	--
Sulfur (wt %)	0.0007	0.0015
NH ₃ (ppmvd)	2.62	--
NH ₃ (ppm@15%O ₂)	2.06	5.00
NH ₃ (lb/hr)	6.65	--
Opacity (%)	0	10
CO ₂ (%)	5.33	--
O ₂ (%)	13.43	--

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. Total hydrocarbons (THC) were report as VOC.

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

Florida Power and Light (FPL) owns and operates the West County Energy Center (West County) located at 20505 State Road 80 in Loxahatchee, Florida. West County is a nominal 2,500 megawatt (MW) greenfield power plant and consists of two combined cycle units (Unit 1 and 2). Each combined cycle unit consists of: three nominal 250 MW Mitsubishi Model 501G combustion turbine-electrical generator (CTGs) sets with evaporative inlet cooling systems; three supplementary-fired heat recovery steam generators (HRSGs) with selective catalytic reduction (SCR) reactors; one nominal 428 million British thermal units per hour (MMBtu/hour) based on low heat value (LHV) natural gas-fired duct burner (DB) located within each of the three HRSG's; and a common nominal 500 MW steam turbine-electrical generator (STG). The total nominal generating capacity of each of the "3 on 1" combined cycle units is approximately 1,250 MW.

Each CTG has a nominal heat input rate of 2,333 MMBtu/hr when firing natural gas and 2,117 MMBtu/hr when firing distillate fuel oil (based on a compressor inlet air temperature of 59 degrees Fahrenheit (°F), the LHV of each fuel, and 100 percent load), includes an automated gas turbine control system, and has dual-fuel capability of firing natural gas as the primary fuel or ultra-low sulfur distillate (ULSD) fuel oil as a restricted alternate fuel. Each HRSG recovers exhaust, heat energy from each of the CTGs. Each Unit delivers steam to each STG. The efficient combustion of natural gas and restricted firing of ULSD fuel oil minimizes the emissions of CO, particulate matter (PM), sulfuric acid mist (H₂SO₄), sulfur dioxide (SO₂) and VOCs. Dry Low-NOx (DLN) combustors for gas firing and water injection for oil firing reduce NOx emissions. A SCR system further reduces NOx emissions.

3.2 SAMPLING LOCATION

The 501G stack is circular and measures 21.95 feet (ft) (263.38 inches) in diameter at the test ports which are approximately 138 ft above grade level with an exit elevation of approximately 150 ft above grade level. The test ports are located approximately 44.31 ft (531.75 inches) downstream and approximately 12 ft (144 inches) upstream from the nearest disturbances. All exhaust samples for gaseous emissions were continuously drawn from the exhaust system at the sample ports from three points determined after conducting a stratification test (Appendix F). During the stratification test three points were traversed from each of the four ports. The probe was allowed to remain at a point for two times the system response time. For NH₃ testing, an initial velocity traverse was performed across the stack at base load from 24 total points. All NH₃ sampling occurred from the same 24 points by leaving the probe at each for an equal amount of 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 Mitsubishi, Model 501G, Unit #1B 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 December 19 and 20, 2010.

**TABLE 4.1
SUMMARY OF SAMPLING METHODS**

Pollutant or Parameter	Sampling Method	Analysis Method
Sample Point Location	EPA Method 1	Equal Area Method
Stack Flow Rate	EPA Method 2	Pitot
Oxygen	EPA Method 3a	Paramagnetic Cell
Carbon Dioxide	EPA Method 3a	Nondispersive Infrared Analyzer
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
Total Hydrocarbons	EPA Method 25a	Flame Ionization Detector
Ammonia Slip	EPA CTM-027	Ion Chromatography M350.3
Sulfur Content Analysis	ASTM D 5453	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, 2, 3a, 7e, 9, 10, 19, 25a, and Conditional Test Method (CTM)-027.

Figure 4.1 depicts the sample system used for the NO_x, CO, THC, CO₂, and O₂ tests. A stainless steel probe 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_x, CO, CO₂, and O₂ analyzers through rotameters that controlled the flow rate of the sample. Exhaust samples were routed to the THC analyzer prior to gas conditioning.

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_x 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.

Figure 4.2 represents the sample system used for the wet chemistry tests (NH₃). A heated stainless steel probe with an inconel liner and stainless steel nozzle was inserted into the sample ports of the stack to extract gas measurements from the emission stream through a filter and glass impinger train. Flow rates are monitored with oil filled manometers and total sample volumes are measured with a dry gas meter.

Three test runs of approximately 60 minutes each were conducted on the Mitsubishi, Model 501G, Unit #1B for NO_x, CO, THC, CO₂, NH₃, opacity, and O₂.

The stack gas analysis for O₂ and CO₂ concentrations was performed in accordance with procedures set forth in EPA Method 3a. The O₂ analyzer uses a paramagnetic cell detector and the CO₂ analyzer uses a continuous nondispersive infrared analyzer.

EPA Method 7e was used to determine concentrations of NO_x. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO₂ in nitrogen certified gas cylinder was used to verify at least a 90 percent NO₂ 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.

THC emission concentrations were quantified in accordance with procedures set forth in EPA Method 25a. A continuous flame ionization (FID) analyzer was used for this purpose. THC emission concentrations were reported as VOC.

**TABLE 4.2
ANALYTICAL INSTRUMENTATION**

Parameter	Model and Manufacturer	Range	Sensitivity	Detection Principle
NO _x	THERMO 42i	User may select up to 5,000 ppm	0.1 ppm	Thermal reduction of NO ₂ to NO. Chemiluminescence of reaction of NO with O ₃ . Detection by PMT. Inherently linear for listed ranges.
CO	THERMO 48i	User may select up to 5,000 ppm	0.1 ppm	Infrared absorption, gas filter correlation detector, microprocessor based linearization.
CO ₂	THERMO 410i	0-20%	0.1%	Non-dispersive infrared.
THC	VIG 20	User may select up to 10,000 ppm	0.1 ppm	Flame Ionization Detector.
O ₂	THERMO 42i	0-25%	0.1%	Paramagnetic cell, inherently linear.

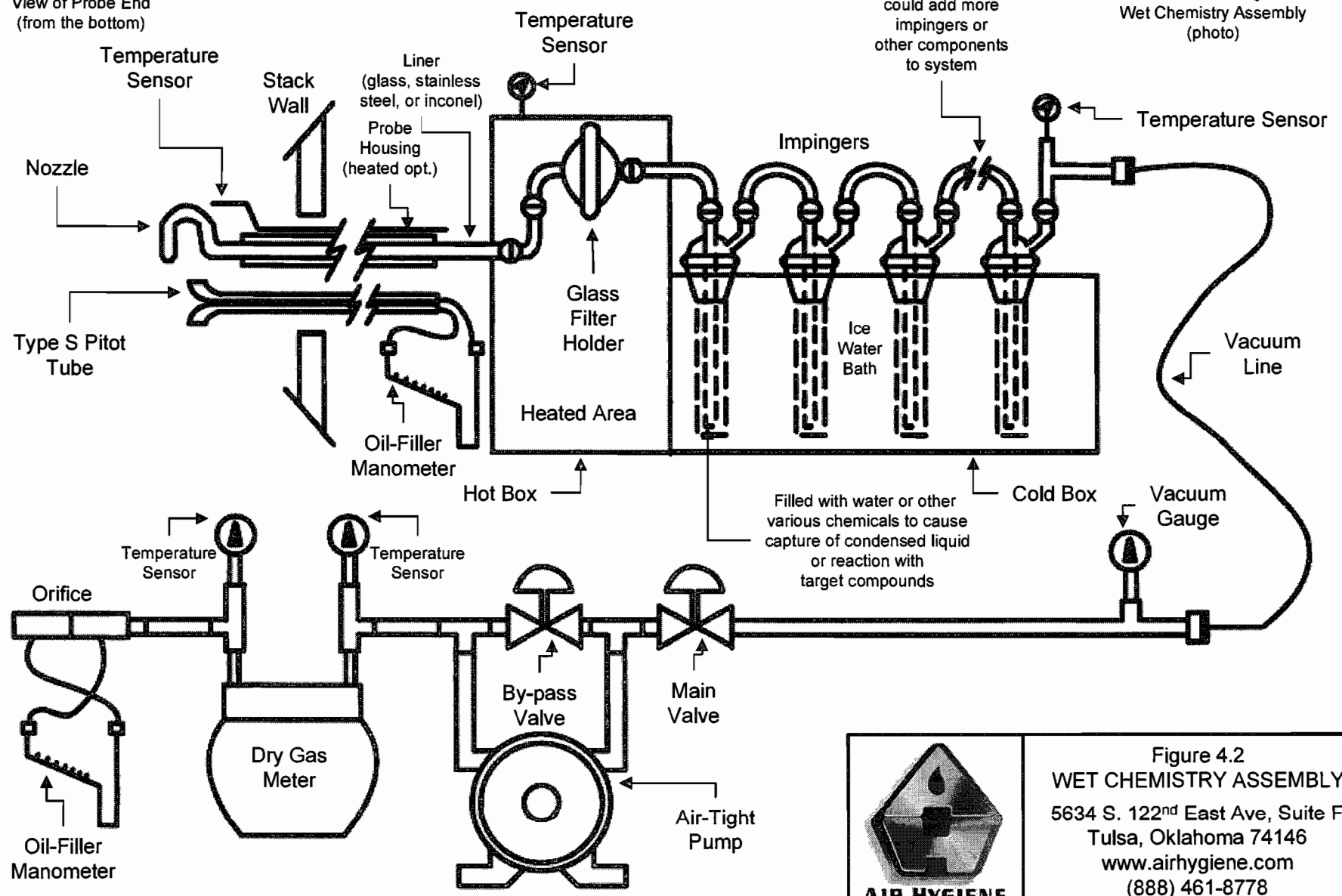
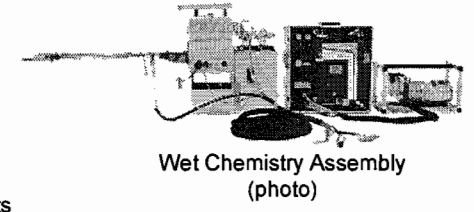
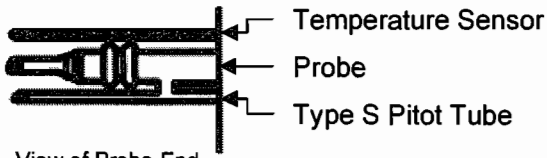


Figure 4.2
WET CHEMISTRY ASSEMBLY
 5634 S. 122nd East Ave, Suite F
 Tulsa, Oklahoma 74146
 www.airhygiene.com
 (888) 461-8778

APPENDIX A
TEST RESULTS AND CALCULATIONS

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

Unit	Load	Test Type	Run	Date	Start	Stop	Time Sync
1B	Base Load	Stratification Test	1	12/19/10	14:37:00	15:32:00	EST
1B	Fuel Oil	Compliance	1-1	12/19/10	16:10:22	17:09:52	EST
1B	Fuel Oil	Compliance	1-2	12/20/10	13:06:03	14:05:33	EST
1B	Fuel Oil	Compliance	1-3	12/20/10	16:30:03	17:29:33	EST
1B	Fuel Oil	Preliminaries	Fuel Oil-V1	12/19/10	14:38:00	15:06:00	EST
1B	Fuel Oil	Ammonia	Fuel Oil-1	12/19/10	16:00:00	17:00:00	EST
1B	Fuel Oil	Ammonia	Fuel Oil-2	12/20/10	13:10:00	14:30:00	EST
1B	Fuel Oil	Ammonia	Fuel Oil-3	12/20/10	16:30:00	17:30:00	EST
1B	Fuel Oil	Opacity	3-1	12/20/10	14:30:00	15:30:00	EST
1B	Fuel Oil	Opacity	3-2	12/20/10	16:30:00	16:30:00	EST
1B	Fuel Oil	Opacity	3-3	12/20/10	16:30:00	17:30:00	EST

**TABLE A.2
MITSUBISHI, 501G, UNIT #1B FUEL OIL LOAD DATA SUMMARY**

Parameter	Fuel Oil Load, Run - 1-1	Fuel Oil Load, Run - 1-2	Fuel Oil Load, Run - 1-3	Average
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	29.81	29.97	30.01	29.93
Amb. Temp. (°F)	62	71	68	67
Rel. Humidity (%)	81	44	52	59
Spec. Humidity (lb water / lb air)	0.009678	0.007212	0.007559	0.008150
Load Designator	Fuel Oil	Fuel Oil	Fuel Oil	Fuel Oil
Turbine Fuel Flow (gal/hr)	16,527	16,331	16,589	16,482
Total Fuel Flow (SCFH)	2,209	2,183	2,218	2,203
Stack Flow (RM19) (SCFH)	57,294,020	57,461,282	57,206,635	57,320,646
Stack Moisture (% Method 4)	9.1	7.8	8.0	8.3
Power Output (megawatts)	233.1	229.1	233.5	231.9
NOx (ppmvd)	7.48	8.62	10.10	8.74
NOx (ppm@15%O ₂)	5.89	6.89	7.91	6.90
NOx (ppm@15%O ₂ &ISO)	6.21	6.75	7.87	6.94
NOx (lb/hr)	51.21	59.36	70.18	60.25
NOx (ton/year) at 500 hr/year	12.80	14.84	17.55	15.06
NOx (lb/MMBtu)	0.023	0.027	0.031	0.027
CO (ppmvd)	10.02	9.99	9.38	9.80
CO (ppm@15%O ₂)	7.89	7.98	7.35	7.74
CO (ppm@15%O ₂ &ISO)	8.32	7.82	7.31	7.82
CO (lb/hr)	41.72	41.84	39.67	41.08
CO (ton/year) at 500 hr/year	10.43	10.46	9.92	10.27
CO (lb/MMBtu)	0.019	0.019	0.017	0.018
VOC (ppmvd)	0.07	0.15	0.00	0.08
VOC (ppm@15%O ₂)	0.06	0.12	0.00	0.06
VOC (ppm@15%O ₂ &ISO)	0.06	0.12	0.00	0.06
VOC (lb/hr)	0.17	0.37	0.00	0.18
VOC (ton/year) at 500 hr/year	0.04	0.09	0.00	0.05
VOC (lb/MMBtu)	0.000	0.000	0.000	0.000
Sulfur (wt %)	0.0007	0.0007	0.0007	0.0007
NH ₃ (ppmvd)	3.56	2.05	2.25	2.62
NH ₃ (ppm@15%O ₂)	2.80	1.62	1.76	2.06
NH ₃ (lb/hr)	9.02	5.22	5.70	6.65
Opacity (%)	0	0	0	0
CO ₂ (%)	5.24	5.35	5.40	5.33
O ₂ (%)	13.40	13.51	13.36	13.43

TEST RESULTS

NO_x, CO, VOC, CO₂, and O₂ Emissions

**Florida Power and Light
December 19, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,527	gal/hr

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	81	%
Ambient Temperature	62	° F
Specific Humidity	0.009678	lb H ₂ O / lb air

Unit Data

Unit Load	233.1	megawatts
Combustor Inlet Pressure	274	psig
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	57,294,020	SCFH

Data from: NH3 Run 1

Fuel Oil Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/19/10 16:10:22	1020	13.29	8.07	10.08	0.00	5.23
12/19/10 16:10:52	1050	13.31	8.11	9.62	0.00	5.24
12/19/10 16:11:22	1080	13.29	8.14	9.94	0.00	5.26
12/19/10 16:11:52	1110	13.29	8.16	10.55	0.00	5.27
12/19/10 16:12:22	1140	13.31	8.12	10.17	0.00	5.25
12/19/10 16:12:52	1170	13.30	7.98	9.74	0.00	5.28
12/19/10 16:13:22	1200	13.27	8.01	9.96	0.00	5.29
12/19/10 16:13:52	1230	13.31	8.13	10.00	0.00	5.26
12/19/10 16:14:22	1260	13.30	7.93	9.69	0.00	5.29
12/19/10 16:14:52	1290	13.27	7.93	10.08	0.00	5.28
12/19/10 16:15:22	1320	13.30	8.14	9.40	0.00	5.28
12/19/10 16:15:52	1350	13.31	8.21	9.52	0.00	5.28
12/19/10 16:16:22	1380	13.29	8.18	10.18	0.00	5.28
12/19/10 16:16:52	1410	13.30	8.30	10.28	0.00	5.28
12/19/10 16:17:22	1440	13.32	8.16	9.80	0.00	5.26
12/19/10 16:17:52	1470	13.30	7.87	9.97	0.00	5.29
12/19/10 16:18:22	1500	13.27	7.96	10.57	0.00	5.29
12/19/10 16:18:52	1530	13.31	8.13	9.95	0.00	5.28
12/19/10 16:19:22	1560	13.29	7.92	9.59	0.00	5.31
12/19/10 16:19:52	1590	13.27	7.80	10.04	0.00	5.30
12/19/10 16:20:22	1620	13.32	7.88	10.16	0.00	5.27
12/19/10 16:20:52	1650	13.30	7.74	10.09	0.00	5.30
12/19/10 16:21:22	1680	13.28	7.86	10.47	0.00	5.30
12/19/10 16:21:52	1710	13.30	7.96	10.17	0.00	5.29
12/19/10 16:22:22	1740	13.32	7.80	10.02	0.00	5.29
12/19/10 16:22:52	1770	13.30	7.54	10.64	0.00	5.30
12/19/10 16:23:22	1800	13.29	7.69	10.57	0.00	5.30
12/19/10 16:23:52	1830	13.30	7.77	9.73	0.00	5.29
12/19/10 16:24:22	1860	13.28	7.94	9.52	0.00	5.31
12/19/10 16:24:52	1890	13.28	7.97	9.95	0.00	5.30
12/19/10 16:25:22	1920	13.32	7.80	10.09	0.00	5.28
12/19/10 16:25:52	1950	13.32	7.68	10.16	0.00	5.30
12/19/10 16:26:22	1980	13.29	7.75	10.81	0.00	5.31
12/19/10 16:26:52	2010	13.29	7.88	9.94	0.00	5.30
12/19/10 16:27:22	2040	13.31	7.80	9.45	0.00	5.31
12/19/10 16:27:52	2070	13.29	7.54	10.20	0.00	5.30
12/19/10 16:28:22	2100	13.28	7.59	9.99	0.00	5.31
12/19/10 16:28:52	2130	13.33	7.63	10.12	0.00	5.30
12/19/10 16:29:22	2160	13.31	7.39	9.89	0.00	5.31
12/19/10 16:29:52	2190	13.29	7.48	10.61	0.00	5.32
12/19/10 16:30:22	2220	13.36	7.58	10.41	0.00	5.28
12/19/10 16:30:52	2250	13.30	7.38	10.26	0.00	5.33
12/19/10 16:31:22	2280	13.27	7.40	10.05	0.00	5.34

**Florida Power and Light
December 19, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,527	gal/hr

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	81	%
Ambient Temperature	62	° F
Specific Humidity	0.009678	lb H ₂ O / lb air

Unit Data

Unit Load	233.1	megawatts
Combustor Inlet Pressure	274	psig
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	57,294,020	SCFH

Data from: NH3 Run 1

Fuel Oil Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/19/10 16:31:52	2310	13.30	7.34	9.90	0.00	5.31
12/19/10 16:32:22	2340	13.31	7.20	9.83	0.00	5.33
12/19/10 16:32:52	2370	13.30	7.08	10.13	0.00	5.33
12/19/10 16:33:22	2400	13.29	7.02	10.69	0.00	5.32
12/19/10 16:33:52	2430	13.33	7.16	10.10	0.00	5.33
12/19/10 16:34:22	2460	13.30	7.06	10.21	0.00	5.33
12/19/10 16:34:52	2490	13.28	7.15	10.24	0.00	5.33
12/19/10 16:35:22	2520	13.31	7.40	9.72	0.00	5.33
12/19/10 16:35:52	2550	13.30	7.19	9.97	0.00	5.32
12/19/10 16:36:22	2580	13.28	7.18	10.76	0.00	5.34
12/19/10 16:36:52	2610	13.33	7.22	10.23	0.00	5.31
12/19/10 16:37:22	2640	13.30	6.91	10.21	0.00	5.34
12/19/10 16:37:52	2670	13.28	7.01	10.43	0.00	5.35
12/19/10 16:38:22	2700	13.31	7.21	10.27	0.00	5.33
12/19/10 16:38:52	2730	13.30	7.25	9.93	0.00	5.35
12/19/10 16:39:22	2760	13.26	7.35	10.55	0.00	5.35
12/19/10 16:39:52	2790	13.30	7.52	10.03	0.00	5.34
12/19/10 16:40:22	2820	13.31	7.28	9.97	0.00	5.34
12/19/10 16:40:52	2850	13.30	6.96	10.48	0.00	5.34
12/19/10 16:41:22	2880	13.29	6.92	10.89	0.00	5.34
12/19/10 16:41:52	2910	13.31	7.03	10.23	0.00	5.33
12/19/10 16:42:22	2940	13.27	7.19	10.41	0.00	5.36
12/19/10 16:42:52	2970	13.27	7.57	9.60	0.00	5.36
12/19/10 16:43:22	3000	13.30	7.79	9.48	0.00	5.34
12/19/10 16:43:52	3030	13.29	7.50	9.80	0.00	5.35
12/19/10 16:44:22	3060	13.28	7.25	10.49	0.00	5.35
12/19/10 16:44:52	3090	13.32	7.26	10.33	0.00	5.33
12/19/10 16:45:22	3120	13.30	7.03	10.37	0.00	5.36
12/19/10 16:45:52	3150	13.27	6.93	10.70	0.00	5.36
12/19/10 16:46:22	3180	13.30	7.16	10.44	0.00	5.35
12/19/10 16:46:52	3210	13.29	7.36	9.72	0.00	5.38
12/19/10 16:47:22	3240	13.27	7.65	9.81	0.00	5.38
12/19/10 16:47:52	3270	13.30	7.65	10.46	0.00	5.36
12/19/10 16:48:22	3300	13.31	7.34	10.31	0.00	5.36
12/19/10 16:48:52	3330	13.29	7.02	10.83	0.00	5.37
12/19/10 16:49:22	3360	13.28	7.30	10.34	0.00	5.38
12/19/10 16:49:52	3390	13.31	7.40	9.84	0.00	5.37
12/19/10 16:50:22	3420	13.29	7.38	9.94	0.00	5.39
12/19/10 16:50:52	3450	13.27	7.50	10.22	0.00	5.39
12/19/10 16:51:22	3480	13.30	7.55	10.28	0.00	5.36
12/19/10 16:51:52	3510	13.31	7.38	10.24	0.00	5.38
12/19/10 16:52:22	3540	13.28	7.36	10.56	0.00	5.39
12/19/10 16:52:52	3570	13.30	7.46	10.73	0.00	5.36

**Florida Power and Light
December 19, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,527	gal/hr

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	81	%
Ambient Temperature	62	° F
Specific Humidity	0.009678	lb H ₂ O / lb air

Unit Data

Unit Load	233.1	megawatts
Combustor Inlet Pressure	274	psig
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	57,294,020	SCFH

Data from: NH3 Run 1

Fuel Oil Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmww)	CO ₂ (%)
12/19/10 16:53:22	3600	13.30	7.39	10.21	0.00	5.38
12/19/10 16:53:52	3630	13.29	7.36	9.99	0.00	5.38
12/19/10 16:54:22	3660	13.29	7.43	10.77	0.00	5.37
12/19/10 16:54:52	3690	13.33	7.38	10.67	0.00	5.37
12/19/10 16:55:22	3720	13.30	7.18	10.47	0.00	5.39
12/19/10 16:55:52	3750	13.28	7.29	10.40	0.00	5.40
12/19/10 16:56:22	3780	13.30	7.41	10.15	0.00	5.38
12/19/10 16:56:52	3810	13.30	7.52	10.03	0.00	5.39
12/19/10 16:57:22	3840	13.28	7.61	10.60	0.00	5.41
12/19/10 16:57:52	3870	13.31	7.63	11.13	0.00	5.37
12/19/10 16:58:22	3900	13.31	7.40	10.62	0.00	5.39
12/19/10 16:58:52	3930	13.30	7.26	10.52	0.00	5.40
12/19/10 16:59:22	3960	13.29	7.32	11.03	0.00	5.39
12/19/10 16:59:52	3990	13.31	7.46	10.30	0.00	5.40
12/19/10 17:00:22	4020	13.27	7.64	10.27	0.00	5.41
12/19/10 17:00:52	4050	13.28	7.85	10.37	0.00	5.41
12/19/10 17:01:22	4080	13.30	7.84	9.93	0.00	5.41
12/19/10 17:01:52	4110	13.29	7.55	9.90	0.00	5.41
12/19/10 17:02:22	4140	13.28	7.64	10.74	0.00	5.41
12/19/10 17:02:52	4170	13.33	7.61	10.69	0.00	5.38
12/19/10 17:03:22	4200	13.32	7.25	10.69	0.00	5.40
12/19/10 17:03:52	4230	13.28	7.41	11.05	0.00	5.41
12/19/10 17:04:22	4260	13.30	7.78	10.02	0.00	5.39
12/19/10 17:04:52	4290	13.30	7.93	9.78	0.00	5.41
12/19/10 17:05:22	4320	13.28	7.91	10.40	0.00	5.41
12/19/10 17:05:52	4350	13.31	7.77	10.32	0.00	5.39
12/19/10 17:06:22	4380	13.29	7.43	10.12	0.00	5.41
12/19/10 17:06:52	4410	13.28	7.51	10.26	0.00	5.41
12/19/10 17:07:22	4440	13.30	7.63	10.31	0.00	5.40
12/19/10 17:07:52	4470	13.32	7.56	10.38	0.00	5.41
12/19/10 17:08:22	4500	13.29	7.55	10.72	0.00	5.43
12/19/10 17:08:52	4530	13.28	7.79	10.21	0.00	5.43
12/19/10 17:09:22	4560	13.31	7.80	9.77	0.00	5.42
12/19/10 17:09:52	4590	13.29	7.66	10.12	0.00	5.45
RAW AVERAGE		13.30	7.56	10.21	0.00	5.34

Florida Power and Light
December 19, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,527	gal/hr

Weather Data

Barometric Pressure	29.81	in. Hg
Relative Humidity	81	%
Ambient Temperature	62	° F
Specific Humidity	0.009678	lb H ₂ O / lb air

Unit Data

Unit Load	233.1	megawatts
Combustor Inlet Pressure	274	psig
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	57,294,020	SCFH

Data from: NH3 Run 1

Fuel Oil Load, Run - 1-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
	Initial Zero	0.07	0.06	0.17	-0.08	0.15
	Final Zero	0.08	0.06	0.44	-0.08	0.15
	Avg. Zero	0.08	0.06	0.31	-0.08	0.15
	Initial UpScale	12.01	12.15	12.25	3.06	8.94
	Final UpScale	12.01	12.23	12.28	3.11	9.02
	Avg. UpScale	12.01	12.19	12.27	3.09	8.98
	Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91

Bias

EMISSIONS DATA	O ₂	NOx	CO	VOC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.40	7.48	10.02	0.07	5.24
Concentration (ppm@ 15%O ₂)	N/A	5.89	7.89	0.06	N/A
Concentration (ppm@ 15%O ₂ & ISO)	N/A	6.21	8.32	0.06	N/A
Emission Rate (lb/hr)	N/A	51.21	41.72	0.17	N/A
Emission Rate (tons/year) at 500 hr/yr	N/A	12.80	10.43	0.04	N/A
Emission Rate (lb/MMBtu)	N/A	0.023	0.019	0.000	N/A

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,331	gal/hr

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	44	%
Ambient Temperature	71	° F
Specific Humidity	0.007212	lb H ₂ O / lb air

Unit Data

Unit Load	229.1	megawatts
Combustor Inlet Pressure	272	psig
Meas. Stack Moisture	7.8	%
Stack Exhaust Flow (M19)	57,461,282	SCFH

Data from: NH3 Run 2

Fuel Oil Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/20/10 13:06:03	19980	13.52	8.01	10.65	0.12	5.54
12/20/10 13:06:33	20010	13.51	8.04	10.45	0.18	5.55
12/20/10 13:07:03	20040	13.48	8.23	10.20	0.18	5.56
12/20/10 13:07:33	20070	13.48	8.43	10.57	0.15	5.56
12/20/10 13:08:03	20100	13.51	8.51	10.08	0.25	5.56
12/20/10 13:08:33	20130	13.50	8.58	9.89	0.30	5.56
12/20/10 13:09:03	20160	13.47	8.90	9.76	0.18	5.59
12/20/10 13:09:33	20190	13.48	9.10	9.69	0.19	5.59
12/20/10 13:10:03	20220	13.51	8.95	9.78	0.19	5.55
12/20/10 13:10:33	20250	13.51	8.63	9.95	0.15	5.56
12/20/10 13:11:03	20280	13.51	8.77	10.21	0.24	5.58
12/20/10 13:11:33	20310	13.50	8.94	10.47	0.18	5.56
12/20/10 13:12:03	20340	13.47	8.90	9.74	0.16	5.57
12/20/10 13:12:33	20370	13.48	8.96	9.35	0.21	5.60
12/20/10 13:13:03	20400	13.48	9.40	9.54	0.27	5.61
12/20/10 13:13:33	20430	13.49	9.46	9.84	0.17	5.57
12/20/10 13:14:03	20460	13.51	9.10	10.00	0.18	5.57
12/20/10 13:14:33	20490	13.55	8.88	10.07	0.27	5.59
12/20/10 13:15:03	20520	13.53	9.01	10.24	0.21	5.59
12/20/10 13:15:33	20550	13.47	9.16	9.72	0.27	5.61
12/20/10 13:16:03	20580	13.49	9.30	9.17	0.37	5.60
12/20/10 13:16:33	20610	13.50	9.57	9.25	0.29	5.58
12/20/10 13:17:03	20640	13.49	9.56	9.93	0.28	5.59
12/20/10 13:17:33	20670	13.48	9.15	10.27	0.36	5.58
12/20/10 13:18:03	20700	13.49	8.80	10.12	0.21	5.56
12/20/10 13:18:33	20730	13.49	9.01	9.59	0.28	5.59
12/20/10 13:19:03	20760	13.46	9.40	9.48	0.31	5.61
12/20/10 13:19:33	20790	13.47	9.39	9.87	0.19	5.57
12/20/10 13:20:03	20820	13.50	9.30	9.84	0.36	5.57
12/20/10 13:20:33	20850	13.49	9.11	9.82	0.37	5.58
12/20/10 13:21:03	20880	13.46	9.05	9.93	0.25	5.59
12/20/10 13:21:33	20910	13.47	9.15	10.48	0.22	5.57
12/20/10 13:22:03	20940	13.49	9.09	9.77	0.36	5.58
12/20/10 13:22:33	20970	13.47	8.93	9.41	0.33	5.60
12/20/10 13:23:03	21000	13.46	9.37	9.94	0.26	5.60
12/20/10 13:23:33	21030	13.51	9.35	10.28	0.36	5.58
12/20/10 13:24:03	21060	13.52	8.64	10.50	0.28	5.58
12/20/10 13:24:33	21090	13.49	8.13	11.13	0.25	5.60
12/20/10 13:25:03	21120	13.47	8.45	10.30	0.37	5.62
12/20/10 13:25:33	21150	13.50	8.85	9.49	0.26	5.63
12/20/10 13:26:03	21180	13.51	9.05	10.05	0.33	5.61
12/20/10 13:26:33	21210	13.49	8.73	11.08	0.35	5.64
12/20/10 13:27:03	21240	13.51	8.58	10.63	0.27	5.63

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,331	gal/hr

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	44	%
Ambient Temperature	71	° F
Specific Humidity	0.007212	lb H ₂ O / lb air

Unit Data

Unit Load	229.1	megawatts
Combustor Inlet Pressure	272	psig
Meas. Stack Moisture	7.8	%
Stack Exhaust Flow (M19)	57,461,282	SCFH

Data from: NH3 Run 2

Fuel Oil Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/20/10 13:27:33	21270	13.49	8.65	10.06	0.38	5.65
12/20/10 13:28:03	21300	13.46	9.01	9.62	0.36	5.69
12/20/10 13:28:33	21330	13.48	9.80	9.70	0.35	5.65
12/20/10 13:29:03	21360	13.52	9.20	10.56	0.24	5.62
12/20/10 13:29:33	21390	13.51	8.59	10.76	0.36	5.67
12/20/10 13:30:03	21420	13.48	8.90	10.38	0.26	5.69
12/20/10 13:30:33	21450	13.50	9.28	10.00	0.22	5.67
12/20/10 13:31:03	21480	13.51	9.08	9.66	0.31	5.69
12/20/10 13:31:33	21510	13.50	8.94	10.09	0.34	5.70
12/20/10 13:32:03	21540	13.48	9.11	10.29	0.33	5.68
12/20/10 13:32:33	21570	13.52	9.12	9.70	0.36	5.68
12/20/10 13:33:03	21600	13.48	8.97	9.54	0.36	5.72
12/20/10 13:33:33	21630	13.45	9.49	9.10	0.34	5.72
12/20/10 13:34:03	21660	13.48	9.74	9.10	0.36	5.70
12/20/10 13:34:33	21690	13.52	9.51	9.47	0.50	5.69
12/20/10 13:35:03	21720	13.50	9.24	9.82	0.37	5.70
12/20/10 13:35:33	21750	13.48	9.45	10.38	0.19	5.70
12/20/10 13:36:03	21780	13.50	9.32	9.63	0.32	5.70
12/20/10 13:36:33	21810	13.47	9.13	9.25	0.36	5.70
12/20/10 13:37:03	21840	13.45	9.32	9.45	0.20	5.69
12/20/10 13:37:33	21870	13.50	9.38	9.79	0.33	5.67
12/20/10 13:38:03	21900	13.51	9.08	9.81	0.36	5.66
12/20/10 13:38:33	21930	13.49	8.65	9.74	0.25	5.67
12/20/10 13:39:03	21960	13.46	8.72	10.06	0.26	5.69
12/20/10 13:39:33	21990	13.49	8.95	9.68	0.36	5.68
12/20/10 13:40:03	22020	13.48	9.02	9.10	0.35	5.68
12/20/10 13:40:33	22050	13.49	8.78	9.45	0.20	5.69
12/20/10 13:41:03	22080	13.49	8.55	10.14	0.34	5.66
12/20/10 13:41:33	22110	13.52	8.43	10.41	0.27	5.63
12/20/10 13:42:03	22140	13.47	8.09	10.10	0.20	5.68
12/20/10 13:42:33	22170	13.46	8.60	9.65	0.37	5.71
12/20/10 13:43:03	22200	13.50	9.03	9.60	0.37	5.66
12/20/10 13:43:33	22230	13.53	8.87	10.01	0.29	5.68
12/20/10 13:44:03	22260	13.51	8.38	10.95	0.18	5.70
12/20/10 13:44:33	22290	13.48	8.38	10.88	0.21	5.70
12/20/10 13:45:03	22320	13.49	8.82	9.17	0.36	5.72
12/20/10 13:45:33	22350	13.48	8.83	9.06	0.28	5.75
12/20/10 13:46:03	22380	13.49	8.92	10.16	0.27	5.73
12/20/10 13:46:33	22410	13.54	8.54	10.37	0.30	5.69
12/20/10 13:47:03	22440	13.51	8.00	10.58	0.23	5.73
12/20/10 13:47:33	22470	13.45	7.86	10.35	0.28	5.76
12/20/10 13:48:03	22500	13.46	8.74	9.33	0.36	5.72
12/20/10 13:48:33	22530	13.50	8.85	9.24	0.17	5.73

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,331	gal/hr

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	44	%
Ambient Temperature	71	° F
Specific Humidity	0.007212	lb H ₂ O / lb air

Unit Data

Unit Load	229.1	megawatts
Combustor Inlet Pressure	272	psig
Meas. Stack Moisture	7.8	%
Stack Exhaust Flow (M19)	57,461,282	SCFH

Data from: NH3 Run 2

Fuel Oil Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmw)	CO ₂ (%)
12/20/10 13:49:03	22560	13.52	8.69	9.98	0.29	5.72
12/20/10 13:49:33	22590	13.51	8.06	11.03	0.35	5.70
12/20/10 13:50:03	22620	13.51	7.99	11.32	0.27	5.70
12/20/10 13:50:33	22650	13.51	8.18	10.09	0.23	5.75
12/20/10 13:51:03	22680	13.47	8.73	9.57	0.33	5.77
12/20/10 13:51:33	22710	13.46	9.16	9.37	0.22	5.77
12/20/10 13:52:03	22740	13.50	9.12	9.42	0.23	5.77
12/20/10 13:52:33	22770	13.50	8.80	9.89	0.28	5.76
12/20/10 13:53:03	22800	13.48	8.70	10.51	0.22	5.79
12/20/10 13:53:33	22830	13.49	8.56	10.34	0.26	5.78
12/20/10 13:54:03	22860	13.50	8.54	9.85	0.37	5.77
12/20/10 13:54:33	22890	13.47	8.54	9.65	0.32	5.80
12/20/10 13:55:03	22920	13.47	8.82	9.53	0.22	5.79
12/20/10 13:55:33	22950	13.52	8.66	9.53	0.36	5.77
12/20/10 13:56:03	22980	13.50	8.31	9.84	0.35	5.78
12/20/10 13:56:33	23010	13.47	8.26	10.72	0.25	5.79
12/20/10 13:57:03	23040	13.48	8.38	9.69	0.26	5.76
12/20/10 13:57:33	23070	13.49	8.71	9.10	0.35	5.77
12/20/10 13:58:03	23100	13.50	8.82	9.96	0.22	5.76
12/20/10 13:58:33	23130	13.50	8.60	10.92	0.26	5.71
12/20/10 13:59:03	23160	13.51	8.31	10.52	0.36	5.71
12/20/10 13:59:33	23190	13.48	8.23	9.88	0.19	5.75
12/20/10 14:00:03	23220	13.46	8.53	9.64	0.26	5.74
12/20/10 14:00:33	23250	13.50	8.66	9.44	0.34	5.71
12/20/10 14:01:03	23280	13.48	8.34	9.43	0.20	5.74
12/20/10 14:01:33	23310	13.40	8.49	9.29	0.22	5.78
12/20/10 14:02:03	23340	13.47	8.57	9.62	0.38	5.72
12/20/10 14:02:33	23370	13.50	7.74	10.80	0.34	5.74
12/20/10 14:03:03	23400	13.46	7.28	11.36	0.21	5.77
12/20/10 14:03:33	23430	13.46	7.36	11.30	0.41	5.74
12/20/10 14:04:03	23460	13.51	7.46	11.69	0.40	5.73
12/20/10 14:04:33	23490	13.46	6.99	11.31	0.33	5.79
12/20/10 14:05:03	23520	13.50	7.05	11.42	0.28	5.75
12/20/10 14:05:33	23550	13.60	6.90	13.41	0.36	5.69
RAW AVERAGE		13.49	8.74	10.03	0.28	5.67

Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,331	gal/hr

Weather Data

Barometric Pressure	29.97	in. Hg
Relative Humidity	44	%
Ambient Temperature	71	°F
Specific Humidity	0.007212	lb H ₂ O / lb air

Unit Data

Unit Load	229.1	megawatts
Combustor Inlet Pressure	272	psig
Meas. Stack Moisture	7.8	%
Stack Exhaust Flow (M19)	57,461,282	SCFH

Data from: NH3 Run 2

Fuel Oil Load, Run - 1-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmww)	CO ₂ (%)
		O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmww)	CO ₂ (%)
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
	Initial Zero	0.09	0.15	0.21	0.00	0.22
	Final Zero	0.12	0.18	-0.09	0.31	0.61
	Avg. Zero	0.11	0.17	0.06	0.16	0.42
	Initial UpScale	12.07	12.23	12.18	2.86	8.94
	Final UpScale	12.11	12.16	12.10	3.16	9.39
	Avg. UpScale	12.09	12.20	12.14	3.01	9.17
	Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91

Bias

EMISSIONS DATA	O ₂	NOx	CO	VOC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.51	8.62	9.99	0.15	5.35
Concentration (ppm@ 15%O ₂)	N/A	6.89	7.98	0.12	N/A
Concentration (ppm@ 15%O ₂ & ISO)	N/A	6.75	7.82	0.12	N/A
Emission Rate (lb/hr)	N/A	59.36	41.84	0.37	N/A
Emission Rate (tons/year) at 500 hr/yr	N/A	14.84	10.46	0.09	N/A
Emission Rate (lb/MMBtu)	N/A	0.027	0.019	0.000	N/A

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,589	gal/hr

Weather Data

Barometric Pressure	30.01	in. Hg
Relative Humidity	52	%
Ambient Temperature	68	° F
Specific Humidity	0.007559	lb H ₂ O / lb air

Unit Data

Unit Load	233.5	megawatts
Combustor Inlet Pressure	275	psig
Meas. Stack Moisture	8.0	%
Stack Exhaust Flow (M19)	57,206,635	SCFH

Data from: NH3 Run 3

Fuel Oil Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/20/10 16:30:03	32220	13.34	10.65	9.78	0.00	5.93
12/20/10 16:30:33	32250	13.35	10.62	9.78	0.00	5.95
12/20/10 16:31:03	32280	13.33	10.75	10.09	0.00	5.95
12/20/10 16:31:33	32310	13.35	10.76	10.31	0.00	5.94
12/20/10 16:32:03	32340	13.33	10.53	9.62	0.00	5.98
12/20/10 16:32:33	32370	13.31	10.62	9.76	0.00	5.97
12/20/10 16:33:03	32400	13.32	10.93	9.74	0.00	5.97
12/20/10 16:33:33	32430	13.34	10.84	9.49	0.00	5.97
12/20/10 16:34:03	32460	13.32	10.90	9.68	0.00	5.97
12/20/10 16:34:33	32490	13.32	11.08	10.02	0.00	5.98
12/20/10 16:35:03	32520	13.36	11.17	9.79	0.00	5.97
12/20/10 16:35:33	32550	13.34	10.96	9.56	0.00	5.96
12/20/10 16:36:03	32580	13.31	10.94	10.10	0.00	5.99
12/20/10 16:36:33	32610	13.32	10.83	9.73	0.00	5.98
12/20/10 16:37:03	32640	13.31	10.54	9.27	0.00	5.98
12/20/10 16:37:33	32670	13.28	10.41	9.12	0.00	6.02
12/20/10 16:38:03	32700	13.30	10.57	9.75	0.00	5.97
12/20/10 16:38:33	32730	13.33	10.23	9.35	0.00	5.97
12/20/10 16:39:03	32760	13.29	10.21	9.50	0.00	6.01
12/20/10 16:39:33	32790	13.27	10.54	9.18	0.00	6.00
12/20/10 16:40:03	32820	13.33	10.66	9.14	0.00	5.98
12/20/10 16:40:33	32850	13.33	10.15	9.63	0.00	5.99
12/20/10 16:41:03	32880	13.31	9.89	10.41	0.00	5.98
12/20/10 16:41:33	32910	13.29	9.80	10.50	0.00	5.99
12/20/10 16:42:03	32940	13.30	9.82	9.24	0.00	6.02
12/20/10 16:42:33	32970	13.31	9.89	9.27	0.00	6.01
12/20/10 16:43:03	33000	13.31	9.98	10.17	0.00	5.99
12/20/10 16:43:33	33030	13.32	9.73	9.73	0.00	5.99
12/20/10 16:44:03	33060	13.29	9.70	9.96	0.00	6.00
12/20/10 16:44:33	33090	13.29	10.22	9.85	0.00	6.01
12/20/10 16:45:03	33120	13.32	10.34	9.49	0.00	5.99
12/20/10 16:45:33	33150	13.32	10.23	9.41	0.00	6.00
12/20/10 16:46:03	33180	13.27	10.29	9.77	0.00	6.05
12/20/10 16:46:33	33210	13.31	10.49	9.36	0.00	6.00
12/20/10 16:47:03	33240	13.31	10.20	9.34	0.00	6.02
12/20/10 16:47:33	33270	13.28	9.77	9.74	0.00	6.05
12/20/10 16:48:03	33300	13.25	9.87	9.42	0.00	6.03
12/20/10 16:48:33	33330	13.29	10.01	8.78	0.00	6.04
12/20/10 16:49:03	33360	13.28	9.87	9.16	0.00	6.05
12/20/10 16:49:33	33390	13.27	9.78	9.70	0.00	6.03
12/20/10 16:50:03	33420	13.32	9.79	10.07	0.00	6.02
12/20/10 16:50:33	33450	13.30	9.67	9.72	0.00	6.04
12/20/10 16:51:03	33480	13.25	10.09	9.44	0.00	6.05

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,589	gal/hr

Weather Data

Barometric Pressure	30.01	in. Hg
Relative Humidity	52	%
Ambient Temperature	68	° F
Specific Humidity	0.007559	lb H ₂ O / lb air

Unit Data

Unit Load	233.5	megawatts
Combustor Inlet Pressure	275	psig
Meas. Stack Moisture	8.0	%
Stack Exhaust Flow (M19)	57,206,635	SCFH

Data from: NH3 Run 3

Fuel Oil Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/20/10 16:51:33	33510	13.27	10.71	8.87	0.00	6.04
12/20/10 16:52:03	33540	13.28	10.59	8.71	0.00	6.05
12/20/10 16:52:33	33570	13.27	10.17	9.02	0.00	6.04
12/20/10 16:53:03	33600	13.26	9.83	9.17	0.00	6.04
12/20/10 16:53:33	33630	13.31	9.49	9.15	0.00	6.02
12/20/10 16:54:03	33660	13.29	9.06	9.31	0.00	6.03
12/20/10 16:54:33	33690	13.28	9.08	9.49	0.00	6.06
12/20/10 16:55:03	33720	13.28	9.55	9.29	0.00	6.03
12/20/10 16:55:33	33750	13.30	9.77	8.91	0.00	6.04
12/20/10 16:56:03	33780	13.27	9.85	8.87	0.00	6.07
12/20/10 16:56:33	33810	13.26	10.10	9.00	0.00	6.04
12/20/10 16:57:03	33840	13.30	10.23	9.16	0.00	6.04
12/20/10 16:57:33	33870	13.30	9.89	9.63	0.00	6.05
12/20/10 16:58:03	33900	13.28	9.93	10.24	0.00	6.04
12/20/10 16:58:33	33930	13.28	9.98	9.65	0.00	6.04
12/20/10 16:59:03	33960	13.28	10.00	8.72	0.00	6.06
12/20/10 16:59:33	33990	13.26	10.04	8.95	0.00	6.07
12/20/10 17:00:03	34020	13.27	10.22	9.22	0.00	6.05
12/20/10 17:00:33	34050	13.32	10.04	9.56	0.00	6.03
12/20/10 17:01:03	34080	13.30	9.69	10.06	0.00	6.05
12/20/10 17:01:33	34110	13.28	9.77	10.65	0.00	6.07
12/20/10 17:02:03	34140	13.29	10.26	9.42	0.00	6.05
12/20/10 17:02:33	34170	13.26	10.72	8.76	0.00	6.09
12/20/10 17:03:03	34200	13.23	11.10	8.73	0.00	6.10
12/20/10 17:03:33	34230	13.28	11.26	8.66	0.00	6.05
12/20/10 17:04:03	34260	13.28	10.79	8.82	0.00	6.08
12/20/10 17:04:33	34290	13.28	10.36	9.36	0.00	6.08
12/20/10 17:05:03	34320	13.27	10.42	9.65	0.00	6.05
12/20/10 17:05:33	34350	13.30	10.45	9.30	0.00	6.08
12/20/10 17:06:03	34380	13.26	10.57	9.03	0.00	6.10
12/20/10 17:06:33	34410	13.23	10.90	8.86	0.00	6.10
12/20/10 17:07:03	34440	13.28	11.23	8.88	0.00	6.08
12/20/10 17:07:33	34470	13.28	10.79	8.95	0.00	6.07
12/20/10 17:08:03	34500	13.25	10.65	9.68	0.00	6.09
12/20/10 17:08:33	34530	13.27	10.66	9.44	0.00	6.08
12/20/10 17:09:03	34560	13.26	10.45	8.92	0.00	6.08
12/20/10 17:09:33	34590	13.23	10.25	9.22	0.00	6.13
12/20/10 17:10:03	34620	13.26	10.74	8.89	0.00	6.11
12/20/10 17:10:33	34650	13.28	10.59	8.98	0.00	6.11
12/20/10 17:11:03	34680	13.28	10.48	9.05	0.00	6.12
12/20/10 17:11:33	34710	13.28	10.35	9.66	0.00	6.10
12/20/10 17:12:03	34740	13.30	10.24	9.44	0.00	6.09
12/20/10 17:12:33	34770	13.26	10.14	9.49	0.00	6.12

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,589	gal/hr

Weather Data

Barometric Pressure	30.01	in. Hg
Relative Humidity	52	%
Ambient Temperature	68	° F
Specific Humidity	0.007559	lb H ₂ O / lb air

Unit Data

Unit Load	233.5	megawatts
Combustor Inlet Pressure	275	psig
Meas. Stack Moisture	8.0	%
Stack Exhaust Flow (M19)	57,206,635	SCFH

Data from: NH3 Run 3

Fuel Oil Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
12/20/10 17:13:03	34800	13.24	10.23	9.59	0.00	6.11
12/20/10 17:13:33	34830	13.26	10.41	9.21	0.00	6.10
12/20/10 17:14:03	34860	13.24	10.19	8.45	0.00	6.14
12/20/10 17:14:33	34890	13.23	10.64	8.85	0.00	6.12
12/20/10 17:15:03	34920	13.27	10.59	9.30	0.00	6.09
12/20/10 17:15:33	34950	13.28	10.38	9.12	0.00	6.11
12/20/10 17:16:03	34980	13.25	10.32	9.64	0.00	6.10
12/20/10 17:16:33	35010	13.26	10.44	8.96	0.00	6.10
12/20/10 17:17:03	35040	13.28	10.25	8.85	0.00	6.10
12/20/10 17:17:33	35070	13.25	9.93	9.27	0.00	6.10
12/20/10 17:18:03	35100	13.24	10.07	9.38	0.00	6.10
12/20/10 17:18:33	35130	13.27	9.95	9.01	0.00	6.09
12/20/10 17:19:03	35160	13.25	10.07	8.97	0.00	6.10
12/20/10 17:19:33	35190	13.25	10.46	9.26	0.00	6.11
12/20/10 17:20:03	35220	13.28	10.45	9.69	0.00	6.06
12/20/10 17:20:33	35250	13.27	10.34	9.69	0.00	6.09
12/20/10 17:21:03	35280	13.24	10.56	9.82	0.00	6.12
12/20/10 17:21:33	35310	13.24	11.17	9.13	0.00	6.08
12/20/10 17:22:03	35340	13.26	11.30	8.90	0.00	6.11
12/20/10 17:22:33	35370	13.23	10.90	9.15	0.00	6.12
12/20/10 17:23:03	35400	13.23	10.92	9.66	0.00	6.09
12/20/10 17:23:33	35430	13.28	10.91	9.04	0.00	6.11
12/20/10 17:24:03	35460	13.25	10.60	9.34	0.00	6.12
12/20/10 17:24:33	35490	13.25	10.99	9.70	0.00	6.10
12/20/10 17:25:03	35520	13.28	10.62	9.42	0.00	6.12
12/20/10 17:25:33	35550	13.25	10.04	9.44	0.00	6.13
12/20/10 17:26:03	35580	13.23	9.76	9.51	0.00	6.14
12/20/10 17:26:33	35610	13.27	9.46	9.11	0.00	6.14
12/20/10 17:27:03	35640	13.23	9.13	9.10	0.00	6.15
12/20/10 17:27:33	35670	13.24	9.28	8.94	0.00	6.16
12/20/10 17:28:03	35700	13.30	9.01	9.80	0.00	6.13
12/20/10 17:28:33	35730	13.29	8.45	10.13	0.00	6.13
12/20/10 17:29:03	35760	13.26	8.29	10.51	0.00	6.17
12/20/10 17:29:33	35790	13.26	8.45	9.91	0.00	6.16
RAW AVERAGE		13.28	10.25	9.41	0.00	6.06

**Florida Power and Light
December 20, 2010
Mitsubishi, 501G, Unit #1B
West County Energy Center**

Fuel Data

Fuel Fd factor	9,202	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,010,715	Btu/SCF fuel
Turbine Fuel Flow	16,589	gal/hr

Weather Data

Barometric Pressure	30.01	in. Hg
Relative Humidity	52	%
Ambient Temperature	68	° F
Specific Humidity	0.007559	lb H ₂ O / lb air

Unit Data

Unit Load	233.5	megawatts
Combustor Inlet Pressure	275	psig
Meas. Stack Moisture	8.0	%
Stack Exhaust Flow (M19)	57,206,635	SCFH

Data from: NH3 Run 3

Fuel Oil Load, Run - 1-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O ₂ (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO ₂ (%)
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
	Initial Zero	0.12	0.18	-0.09	0.31	0.61
	Final Zero	-0.11	0.16	-0.04	0.01	0.80
	Avg. Zero	0.01	0.17	-0.07	0.16	0.71
	Bias					
	Initial UpScale	12.11	12.16	12.10	3.16	9.39
	Final UpScale	11.94	12.34	12.22	2.96	9.67
	Avg. UpScale	12.03	12.25	12.16	3.06	9.53
	Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91

EMISSIONS DATA	O ₂	NOx	CO	VOC	CO ₂
Corrected Raw Average (ppm/% dry basis)	13.36	10.10	9.38	0.00	5.40
Concentration (ppm@ 15%O ₂)	N/A	7.91	7.35	0.00	N/A
Concentration (ppm@ 15%O ₂ & ISO)	N/A	7.87	7.31	0.00	N/A
Emission Rate (lb/hr)	N/A	70.18	39.67	0.00	N/A
Emission Rate (tons/year) at 500 hr/yr	N/A	17.55	9.92	0.00	N/A
Emission Rate (lb/MMBtu)	N/A	0.031	0.017	0.000	N/A

TEST RESULTS

NH₃ Emissions



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

AMMONIA ANALYSIS

PARAMETER	UNITS	RUN						BLANK
		1		2		3		
		Front (f)	Back (b)	Front (f)	Back (b)	Front (f)	Back (b)	
Sample Number		02	03	04	05	06	07	01
Lab Log Number		U1B-R1-FH	U1B-R1-BH	U1B-R2-FH	U1B-R2-BH	U1B-R3-FH	U1B-R3-BH	BLANK
Results (C_f or C_b)	(mg/L)	18.2000	0.2820	14.0000	0.1000	15.2000	0.3810	0.1000
Practical Quantitation Limit (PQL)	(mg/L)	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Sample Volume (V_{NH_3})	(ml)	175	150	150	150	150	150	100
DGM Volume (V_m) _{dscf}	(dscf)	42.08		47.85		48.17		48.17
DGM Volume (V_m) _{dstdL}	(L _{dstd})	1191.62		1354.88		1363.98		1363.98
Sum of NH ₃ Ion (N)	(mg/L)	18.2000	0.2820	14.0000	0.1000	15.2000	0.3810	0.1000
Total Sample Volume (S)	(ml)	175	150	150	150	150	150	100
Volume of NH ₃ (V_a)	(L)	0.00419	0.00006	0.00276	0.00002	0.00300	0.00008	0.00001
O ₂ Concentration	(%)	13.40		13.51		13.36		N/A
NH ₃ Concentration (C_{NH_3})	(ppmvd)	3.56		2.05		2.25		0.010
C_{NH_3} @ 15% O ₂	(ppmvd)	2.80		1.64		1.76		N/A

Equations & Constants:

Example Using Data from the 1st run

DGM Volume (L_{dstd})

$$(V_m)_{dstdL} (L_{dstd}) = (V_m)_{dscf} \times 28.31685$$

$$(V_m)_{dstdL} (L_{dstd}) = 42.08 \text{ dscf} \times 28.31685 \text{ L/ft}^3 = 1191.62 \text{ L}_{dstd}$$

$(V_m)_{dscf}$ = Volume of gas sample measured by the DGM, corrected to standard conditions.

C_f = Concentration of NH₃ ion in the front half of train (main catch)

MW = molecular weight (ref. ASTM D 3588)

C_b = Concentration of NH₃ ion in the back half of train (breakthrough)

Volume of NH₃ (L)

$$V_a (L) = \frac{N \times S}{MW \times 1000} \times 22.4$$

$$V_a (L) = \frac{18.2 \text{ mg}}{L} \times \frac{175 \text{ ml}}{1000 \text{ ml}} \times \frac{22.4 \text{ L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol NH}_3}{17.03 \text{ g}} \times \frac{\text{g}}{1000 \text{ mg}} = 0.00419 \text{ L}$$

NH₃ Concentration (ppmvd)

$$C_{NH_3} (\text{ppmvd}) = \frac{V_{a(\text{front})} + V_{a(\text{back})}}{(V_m)_{dstdL}} \times 10^6$$

$$C_{NH_3} (\text{ppmvd}) = \frac{0.00419 \text{ L} + 0.00006 \text{ L}}{1191.62 \text{ L}_{dstd}} \times \frac{10^6 \text{ parts}}{1 \text{ part}} = 3.562 \text{ ppmvd}$$

22.4 = liters of ideal gas per mol of substance at 0°C and 1 atm (ref. Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg)

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center	Date	December 19-20, 2010
Sampling Location	Unit 1B	Project #	bv-09-westcounty.fl-comp#1
Operator	MV	Stack Type	Circular

Historical Data						
Run Number		Fuel Oil-1	Fuel Oil-2	Fuel Oil-3	Average	
Run Start Time		16:00	13:10	16:30		hh:mm
Run Stop Time		17:00	14:30	17:30		hh:mm
Meter Calibration Factor	(Y)	0.996	0.996	0.996		
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840		
Average Nozzle Diameter	(D _{na})	0.242	0.242	0.241		in

Stack Test Data						
Initial Meter Volume	(V _m) _i	837.915	895.640	944.380		ft ³
Final Meter Volume	(V _m) _f	880.501	944.030	992.780		ft ³
Total Meter Volume	(V _m)	42.586	48.390	48.400	46.459	ft ³
Total Sampling Time	(Θ)	60.0	60.0	60.0	60.0	min
Average Meter Temperature	(t _m) _{avg}	73.9	77.1	73.6	74.9	oF
Average Stack Temperature	(t _s) _{avg}	234.2	240.0	241.5	238.6	oF
Barometric Pressure	(P _b)	29.91	30.06	30.06	30.01	in Hg
Stack Static Pressure	(P _{static})	-0.85	-0.79	-0.82	-0.82	in H ₂ O
Absolute Stack Pressure	(P _s)	29.85	30.00	30.00	29.95	in Hg
Average Orifice Pressure Drop	(ΔH) _{avg}	1.73	2.10	2.14	1.99	in H ₂ O
Absolute Meter Pressure	(P _m)	30.04	30.19	30.19	30.14	in Hg
Avg Square Root Pitot Pressure	($\Delta P^{1/2}$) _{avg}	0.80	0.93	0.94	0.89	(in H ₂ O) ^{1/2}

Moisture Content Data						
Impingers 1-3 Water Volume Gain	(V _n)	73.5	75.7	61.1	70.1	ml
Impinger 4 Silica Gel Weight Gain	(W _n)	16.5	10.5	16.1	14.4	g
Total Water Volume Collected	(V _{lc})	90.1	86.3	77.2	84.5	ml
Standard Water Vapor Volume	(V _w) _{std}	4.239	4.060	3.636	3.978	scf
Standard Meter Volume	(V _m) _{std}	42.082	47.847	48.169	46.032	dscf
Calculated Stack Moisture	(B _{ws(calc)})	9.14	7.82	7.02	7.99	%
Saturated Stack Moisture	(B _{ws(evap)})	100.0	100.0	100.0	100.0	%
Reported Stack Moisture Content	(B _{ws})	9.14	7.82	7.02	7.99	%

Gas Analysis Data						
Carbon Dioxide Percentage	(%CO ₂)	5.2	5.4	5.4	5.3	%
Oxygen Percentage	(%O ₂)	13.4	13.5	13.4	13.4	%
Carbon Monoxide Percentage	(%CO)	0.0	0.0	0.0	0.0	%
Nitrogen Percentage	(%N ₂)	81.4	81.1	81.2	81.2	%
Dry Gas Molecular Weight	(M _d)	29.37	29.40	29.40	29.39	lb/lb-mole
Wet Stack Gas Molecular Weight	(M _s)	28.33	28.51	28.60	28.48	lb/lb-mole
Calculated Fuel Factor	(F _o)	1.431	1.381	1.396	1.403	
Fuel F-Factor	(F _d)	9202	9202	9202	9202	dscf/MMBtu
Percent Excess Air	(%EA)	165.9	170.8	165.2	167.3	%
Percent of Isokinetic Rate	(I)	102.9	100.2	99.7	100.9	%

Ammonia Rate Data						
Stack Ammonia Concentration	(C _{NH3})	3.56	2.05	2.25	2.62	ppm
	(C _{NH3})	2.80	1.64	1.76	2.07	ppm@15%O ₂

Ammonia Sample Log-In Sheet

Lab Tech: Albert Septiano
 Project: bv-09-westcounty.fl-comp#1
 Collected by: AS
 Date Received: December 19-20, 2010



AIR HYGIENE

BLANKS

AHI Lab #	Sample ID	Sample Source Description	Run #	Filter	Contents	Sample Date	Comments	Volume (ml)
BLANK	01	Unit 1B fuel oil			H ₂ SO ₄ , H ₂ O	12/19/2020		100

SAMPLES

AHI Lab #	Sample ID	Sample Source Description	Run #	Contents	Sample Date	Comments	Volume (ml)
U1B-R1-FH	02	Unit 1B Run 1 fuel oil Front Half	1	H ₂ SO ₄ , H ₂ O	12/19/2020		175
U1B-R1-BH	03	Unit 1B Run 1 fuel oil Back Half	1	H ₂ SO ₄ , H ₂ O	12/19/2020		150
U1B-R2-FH	04	Unit 1B Run 2 fuel oil Front Half	2	H ₂ SO ₄ , H ₂ O	12/20/2010		150
U1B-R2-BH	05	Unit 1B Run 2 fuel oil Back Half	2	H ₂ SO ₄ , H ₂ O	12/20/2010		150
U1B-R3-FH	06	Unit 1B Run 3 fuel oil Front Half	3	H ₂ SO ₄ , H ₂ O	12/20/2010		150
U1B-R3-BH	07	Unit 1B Run 3 fuel oil Back Half	3	H ₂ SO ₄ , H ₂ O	12/20/2010		150

Ammonia Sample Measurement

Lab Tech:	Albert Septiano
Project:	bv-09-westcounty.fl-comp#1
Date Analyzed:	12/19/2010
Time Analyzed:	2:00 PM
Temp (°F)	68.0
Humidity	40%
BP (In HG)	29.91
Analysis Method	350.3



Lab Tech:	Mekund Venkitachalam
Project:	bv-09-westcounty.fl-comp#1
Date Analyzed:	12/20/2010
Time Analyzed:	3:00 PM
Temp (°F)	68.0
Humidity	40%
BP (In HG)	30.00
Analysis Method	350.3

Calibration Data 12/19/2010			Calibration Data 12/20/2010		
Concentration (ppm)	Pre-Cal (ppm)	Pre-Cal (mV)	Concentration (ppm)	Pre-Cal (ppm)	Pre-Cal (mV)
5.0	4.9	-41.2	5.0	5.0	-43.2
10.0	10.1	-57.8	10.0	10.0	-58.7
20.0	19.9	-75.5	20.0	19.8	-76.5
Slope			Slope		
Linearity	1.0026	N/A	Linearity	1.0124	N/A

Sample ID	Sample Amt Used (ml)	ISA/pH Volume (ml)	Meter Reading (mg/L)	Time Analyzed (hh:mm:ss)	Dilution Factor	Sample Volume	MQL (mg/L)	PQL (mg/L)	Final Conc. (mg/L)
BLANK	80.0	2.0	0.0	18:00:00	1.0	100.0	0.10	0.1	BPQL
U1B-R1-FH	80.0	2.0	18.2	18:40:00	1.0	175.0	0.10	0.1	18.2
U1B-R1-BH	80.0	2.0	0.3	18:47:00	1.0	150.0	0.10	0.1	0.3
U1B-R2-FH	80.0	2.0	14.0	16:08:00	1.0	150.0	0.10	0.1	14.0
U1B-R2-BH	80.0	2.0	0.1	16:15:00	1.0	150.0	0.10	0.1	BPQL
U1B-R3-FH	80.0	2.0	15.2	18:33:00	1.0	150.0	0.10	0.1	15.2
U1B-R3-BH	80.0	2.0	0.4	18:42:00	1.0	150.0	0.10	0.1	0.4



Ammonia Analysis

Project Name: bv-09-westcounty.fl-comp#1
Date Received: December 19-20, 2010

AHI Lab No.: BLANK
Sample ID: 01
Sampling Date: 12/19/2020

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	BPQL	0.10	12/19/10 18:00
Volume	Volume in ml	N/A	100	N/A	12/19/10 14:00

AHI Lab No.: U1B-R1-FH
Sample ID: 02
Sampling Date: 12/19/2020

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	18.2	0.10	12/19/10 18:40
Volume	Volume in ml	N/A	175	N/A	12/19/10 14:00

AHI Lab No.: U1B-R1-BH
Sample ID: 03
Sampling Date: 12/19/2020

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	0.282	0.10	12/19/10 18:47
Volume	Volume in ml	N/A	150	N/A	12/19/10 14:00

AHI Lab No.: U1B-R2-FH
Sample ID: 04
Sampling Date: 12/20/2010

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	14	0.10	12/19/10 16:08
Volume	Volume in ml	N/A	150	N/A	12/19/10 14:00

AHI Lab No.: U1B-R2-BH
Sample ID: 05
Sampling Date: 12/20/2010

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	BPQL	0.10	12/19/10 16:15
Volume	Volume in ml	N/A	150	N/A	12/19/10 14:00

AHI Lab No.: U1B-R3-FH
Sample ID: 06
Sampling Date: 12/20/2010

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	15.2	0.10	12/19/10 18:33
Volume	Volume in ml	N/A	150	N/A	12/19/10 14:00

AHI Lab No.: U1B-R3-BH
Sample ID: 07
Sampling Date: 12/20/2010

Test Requested	Method Parameter	Prep Info	Result	PQL*	Analysis Date
Ammonia Nitrogen	EPA 350.3 Ammonia	N/A	0.381	0.10	12/19/10 18:42
Volume	Volume in ml	N/A	150	N/A	12/19/10 14:00

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

ALARMS exist and have been acknowledged.

Source Information				
Plant Name	West County Energy Center			
Sampling Location	Unit 1B			
Fuel or Source Type	Oil, Distillate			
Fuel F-Factor	9202	9202	9202	

Test Information			
Starting Test Date		December 19-20, 2010	
Project #		bv-09-westcounty.fl-comp#1	
Operator		MV	
Standard Temperature		68	oF
Standard Pressure		29.92	in Hg
Minimum Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		1B	
Load	% or w/DB	Fuel Oil	
Base Run Number		Fuel Oil	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Circular Stack			

Test Equipment Information					
Run		1	2	3	
Meter Box Number	from ACS	samp-pc-0009	samp-pc-0009	samp-pc-0009	
Meter Calibration Factor	(Y)	0.996	0.996	0.996	
Orifice Meter Coefficient	($\Delta H @$)	1.775	1.775	1.775	in H ₂ O
Pitot Tube Coefficient	(C _p)	0.840	0.840	0.840	
Nozzle Diameter	(D _n)	0.242	0.242	0.241	in
Probe Length		120.00	120.00	120.00	in
(SS, Glass) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	samp-bc-0019	samp-bc-0020	samp-bc-0019	
Impinger Case Number	from ACS	samp-bc-0020	samp-bc-0022	samp-bc-0020	

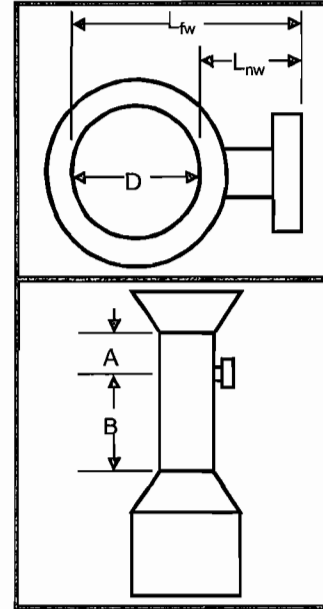
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Ave., Suite F
City, State Country Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	Date	December 19-20, 2010
Sampling Location	Unit 1B	Project #	bv-09-westcounty.fl-comp#1
Operator	MV	# of Ports Available	4
Stack Type	Circular	# of Ports Used	4
Stack Size	Large	Port Inside Diameter	6.00

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L _{fw})	282.38	in
Distance to Near Wall of Stack	(L _{nw})	19.00	in
Diameter of Stack	(D)	263.38	in
Area of Stack	(A _s)	378.35	ft ²

Distance from Port to Disturbances			
Distance Upstream	(A)	144.00	in
Diameters Upstream	(A _D)	0.55	diameters
Distance Downstream	(B)	531.75	in
Diameters Downstream	(B _D)	2.02	diameters



Number of Traverse Points Required			
Diameters to Flow Disturbance		Minimum Number of Traverse Points	
Down Stream	Up Stream	Particulate Points	Velocity Points
2.00-4.99	0.50-1.24	24	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
>= 8.00	>=2.00	8 or 12 ²	8 or 12 ²
Upstream Spec		24	16
Downstream Spec		24	16
Traverse Pts Required		24	16

¹ Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

² 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

Location of Traverse Points in Circular Stacks									
Traverse Point	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Number	Number of Traverse Points Across the Stack								
	2	4	6	8	10	12	14	16	18
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.290	.146	.105	.082	.067	.057	.049	.044
3		.750	.298	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.148	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.958	.806	.658	.358	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.362
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Number of Traverse Points Used			
4	Ports by	6	Across
24	Pts Used	24	Required
		Particulate Traverse	

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Diameter	Distance from Inside Wall	Distance Including Reference Length
		in	in
1	0.02	5 4/8	24 4/8
2	0.07	17 5/8	36 5/8
3	0.12	31 1/8	50 1/8
4	0.18	46 5/8	65 5/8
5	0.25	65 7/8	84 7/8
6	0.36	93 6/8	112 6/8
7			
8			
9			
10			
11			
12			

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center				Date	December 19-20, 2010			
Sampling Location	Unit 1B				Project #	bv-09-westcounty.fl-comp#1			
Operator	MV				# of Ports Used	4			
Fuel Type	Oil, Distillate		Minimum Fuel Factor	1.260	Maximum Fuel Factor	1.413			
Orsat Leak Check	<input checked="" type="checkbox"/>	PreTest	<input checked="" type="checkbox"/>	PostTest	Orsat Identification	N/A			

Gas Analysis Data										
Run Number		Fuel Oil-1			Run Start Time		16:00	Run Stop Time		17:00
Sample Analysis Time	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (ppmCO)	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (%CO)	Nitrogen Conc. (%N ₂)	Dry Molecular Weight (M _d)	Molecular Weight Deviation (ΔM _d)	
hh:mm	percent	percent	ppm	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole	
1:00	5.2	13.4	10.0	5.2	13.4	0.0	81.4	29.37	0.00	
Results			Averages		5.2	13.4	0.0	81.4	29.37	
Average Calculated Fuel Factor			(F _o) _{avg}		1.431	Molecular Wt Deviation < 0.3?			<input checked="" type="checkbox"/>	
Average Excess Air			(EA) _{avg}		165.9	Fuel Factor in Handbook Range?			<input checked="" type="checkbox"/>	

Gas Analysis Data										
Run Number		Fuel Oil-2			Run Start Time		13:10	Run Stop Time		14:30
Sample Analysis Time	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (ppmCO)	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (%CO)	Nitrogen Conc. (%N ₂)	Dry Molecular Weight (M _d)	Molecular Weight Deviation (ΔM _d)	
hh:mm	percent	percent	ppm	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole	
1:20	5.4	13.5	10.0	5.4	13.5	0.0	81.1	29.40	0.00	
Results			Averages		5.4	13.5	0.0	81.1	29.40	
Average Calculated Fuel Factor			(F _o) _{avg}		1.381	Molecular Wt Deviation < 0.3?			<input checked="" type="checkbox"/>	
Average Excess Air			(EA) _{avg}		170.8	Fuel Factor in Handbook Range?			<input checked="" type="checkbox"/>	

Gas Analysis Data										
Run Number		Fuel Oil-3			Run Start Time		16:30	Run Stop Time		17:30
Sample Analysis Time	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (ppmCO)	Carbon Dioxide Conc. (%CO ₂)	Oxygen Conc. (%O ₂)	Carbon Monoxide Conc. (%CO)	Nitrogen Conc. (%N ₂)	Dry Molecular Weight (M _d)	Molecular Weight Deviation (ΔM _d)	
hh:mm	percent	percent	ppm	percent	percent	percent	percent	lb/lb-mole	lb/lb-mole	
1:00	5.4	13.4	9.4	5.4	13.4	0.0	81.2	29.40	0.00	
Results			Averages		5.4	13.4	0.0	81.2	29.40	
Average Calculated Fuel Factor			(F _o) _{avg}		1.396	Molecular Wt Deviation < 0.3?			<input checked="" type="checkbox"/>	
Average Excess Air			(EA) _{avg}		165.2	Fuel Factor in Handbook Range?			<input checked="" type="checkbox"/>	

Fuel Factor F _o		
Fuel Type	Minimum	Maximum
Coal, Anthracite	1.016	1.130
Coal, Lignite	1.016	1.130
Coal, Bituminous	1.083	1.230
Oil, Distillate	1.260	1.413
Oil, Residual	1.210	1.370
Gas, Natural	1.600	1.836
Gas, Propane	1.434	1.586
Gas, Butane	1.405	1.553
Wood	1.000	1.120
Wood Bark	1.003	1.130

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center			Date	December 19-20, 2010		
Sampling Location	Unit 1B			Project #	bv-09-westcounty.fl-comp#1		
Operator	MV			# of Ports Used	4		
Stack Type	Circular			Meter Box Number	samp-pc-0009		
Train Leak Check	<input checked="" type="checkbox"/>	PreTest	<input checked="" type="checkbox"/>	PostTest	Meter Cal Factor (Y)	0.996	

Moisture Content Data								
Run Number	Fuel Oil-1	Run Start Time			16:00	Run Stop Time		17:00
Total Meter Volume	(V _m)	42.586	dcf	Barometric Press.		(P _b)	29.91	in Hg
Avg Stack Temp	(t _s) _{avg}	234	oF	Stack Static Press.		(P _{static})	-0.85	in H2O
Avg Meter Temp	(t _m) _{avg}	74	oF	Avg Orifice Press.		(ΔH) _{avg}	1.73	in H2O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	g	g	g	g	g	g	g	g
Contents		H2SO4	H2SO4	Sil Gel				
Final Value	(V _f),(W _f)	800.40	759.00	578.90	828.40			
Initial Value	(V _i),(W _i)	746.20	744.20	574.50	811.90			
Net Value	(V _n),(W _n)	54.2	14.8	4.4	16.5			
Results								
Total Weight	(W _i)	89.90	g	Water Vol Weighed		(V _{wsg(std)})	4.239	scf
Std Meter Volume	(V _{m(std)})	42.113	dscf	Sat. Moisture Content		(B _{ws(svp)})	100.0	%
Calc Moisture Content	(B _{ws(calc)})	9.1	%	Final Moisture Content		(B _{ws})	9.1	%

Moisture Content Data								
Run Number	Fuel Oil-2	Run Start Time			13:10	Run Stop Time		14:30
Total Meter Volume	(V _m)	48.390	dcf	Barometric Press.		(P _b)	30.06	in Hg
Avg Stack Temp	(t _s) _{avg}	240	oF	Stack Static Press.		(P _{static})	-0.79	in H2O
Avg Meter Temp	(t _m) _{avg}	77	oF	Avg Orifice Press.		(ΔH) _{avg}	2.10	in H2O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	g	g	g	g	g	g	g	g
Contents		H2SO4	H2SO4	Sil Gel				
Final Value	(V _f),(W _f)	798.40	793.10	581.80	792.60			
Initial Value	(V _i),(W _i)	741.40	777.80	578.50	782.10			
Net Value	(V _n),(W _n)	57.0	15.3	3.3	10.5			
Results								
Total Weight	(W _i)	86.10	g	Water Vol Weighed		(V _{wsg(std)})	4.060	scf
Std Meter Volume	(V _{m(std)})	47.849	dscf	Sat. Moisture Content		(B _{ws(svp)})	100.0	%
Calc Moisture Content	(B _{ws})	7.8	%	Final Moisture Content		(B _{ws})	7.8	%

Moisture Content Data								
Run Number	Fuel Oil-3	Run Start Time			16:30	Run Stop Time		17:30
Total Meter Volume	(V _m)	48.400	dcf	Barometric Press.		(P _b)	30.06	in Hg
Avg Stack Temp	(t _s) _{avg}	241	oF	Stack Static Press.		(P _{static})	-0.82	in H2O
Avg Meter Temp	(t _m) _{avg}	74	oF	Avg Orifice Press.		(ΔH) _{avg}	2.14	in H2O
	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7	Impinger 8
	g	g	g	g	g	g	g	g
Contents		H2SO4	H2SO4	Sil Gel				
Final Value	(V _f),(W _f)	791.30	785.70	612.10	883.90			
Initial Value	(V _i),(W _i)	748.90	771.70	607.50	867.80			
Net Value	(V _n),(W _n)	42.4	14.0	4.6	16.1			
Results								
Total Weight	(W _i)	77.10	g	Water Vol Weighed		(V _{wsg(std)})	3.635	scf
Std Meter Volume	(V _{m(std)})	48.171	dscf	Sat. Moisture Content		(B _{ws(svp)})	100.0	%
Calc Moisture Content	(B _{ws})	7.0	%	Final Moisture Content		(B _{ws})	7.0	%

CTM 027 (AMMONIA) - SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	Date	December 19-20, 2010
Sampling Location	Unit 1B	Project #	bv-09-westcounty.fl-comp#1
Operator	MV	Acetone Lot Number	N/A

Run History Data				
Run Number	Fuel Oil-1	Fuel Oil-2	Fuel Oil-3	
Run Start Time	16:00	13:10	16:30	(hh:mm)
Run Stop Time	17:00	14:30	17:30	(hh:mm)
Train Prepared By	AS	AS	MV	
Train Recovered By	AS	MV	MV	
Recovery Date	12/19/2010	12/20/2010	12/20/2010	(mm/dd/yy)

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Volume					
Final Volume	(V _f)	2142.2	2177.2	2193.0	ml
Initial Volume	(V _i)	2068.6	2101.5	2131.9	ml
Net Volume	(V _n)	73.5	75.7	61.1	ml
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W _f)	828.4	792.6	883.9	g
Initial Weight	(W _i)	811.9	782.1	867.8	g
Net Weight	(W _n)	16.5	10.5	16.1	g
Comments					
Total Water Collected					
Total Volume	(V _c)	90.1	86.3	77.2	ml



TEST RESULTS

Opacity

Company: Florida Power and Light Equipment: Mitsubishi 501G, Unit 1B Fuel Oil Location: West County Energy Center Date: December 19, 2010 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: Mitsubishi 501G, Unit 1B Fuel Oil
Location: West County Energy Center
Date: December 19, 2010
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

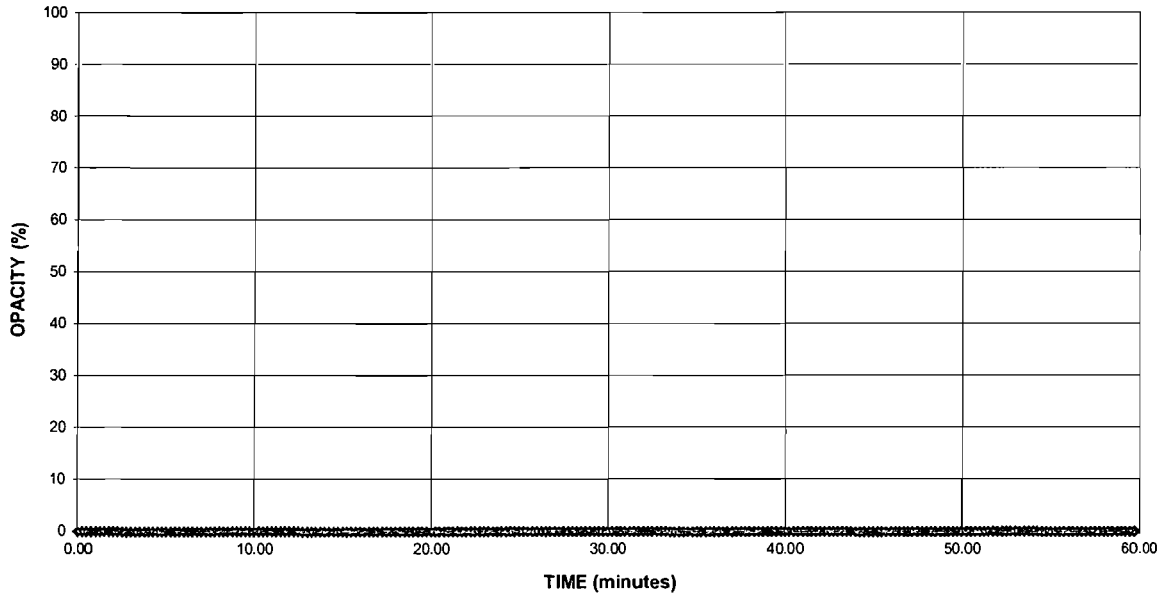
Company: Florida Power and Light Equipment: Mitsubishi 501G, Unit 1B Fuel Oil Location: West County Energy Center Date: December 19, 2010 Project #: bv-09-westcounty.fl-comp#1						Run 3	Average Opacity: 0.00 % Maximum Opacity: 0 % 6 Minute Average: 0.00 % 6 Minute Maximum: 0.00 % Max Time w/ Opacity: 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: Mitsubishi 501G, Unit 1B Fuel Oil
Location: West County Energy Center
Date: December 19, 2010
Project #: bv-09-westcounty.fl-comp#1

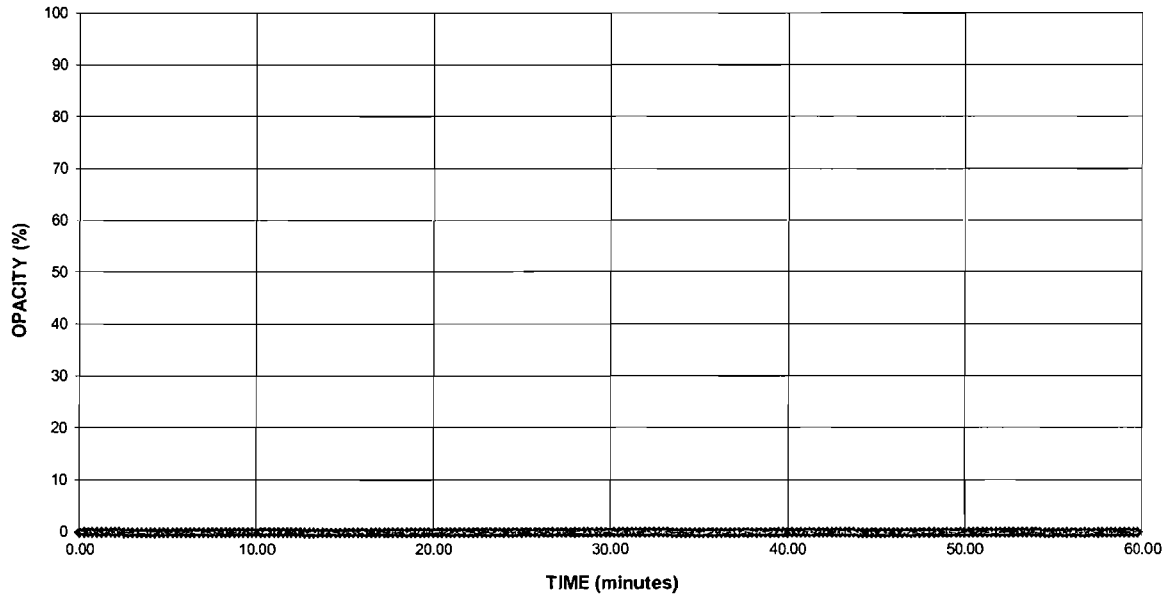
Run 1

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)**

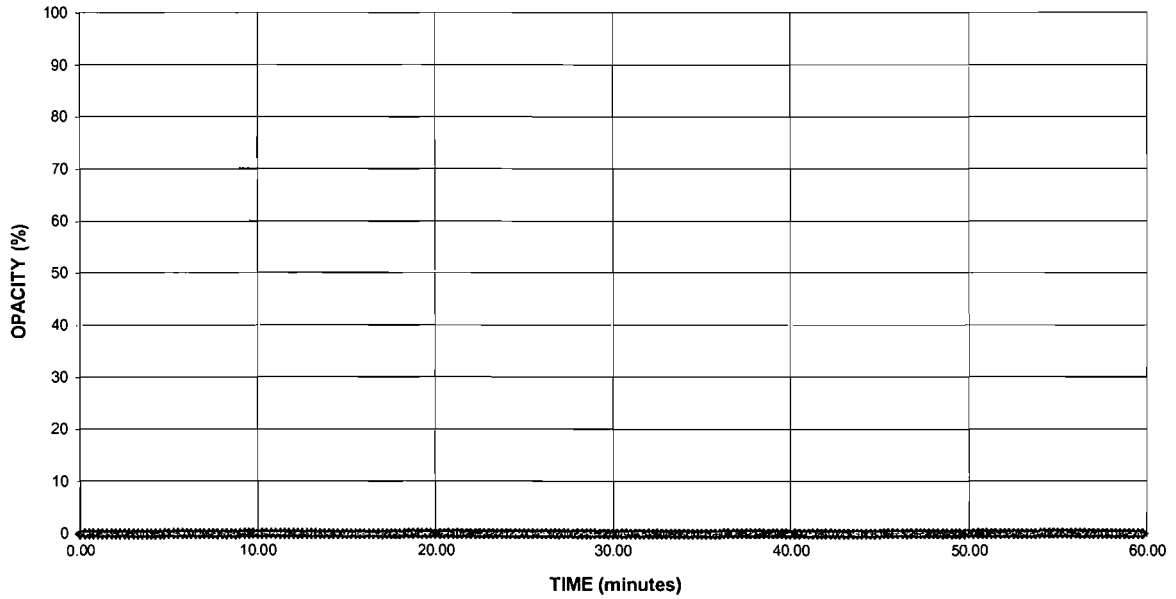


Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 1B Fuel Oil
Location: West County Energy Center
Date: December 19, 2010
Project #: bv-09-westcounty.fl-comp#1

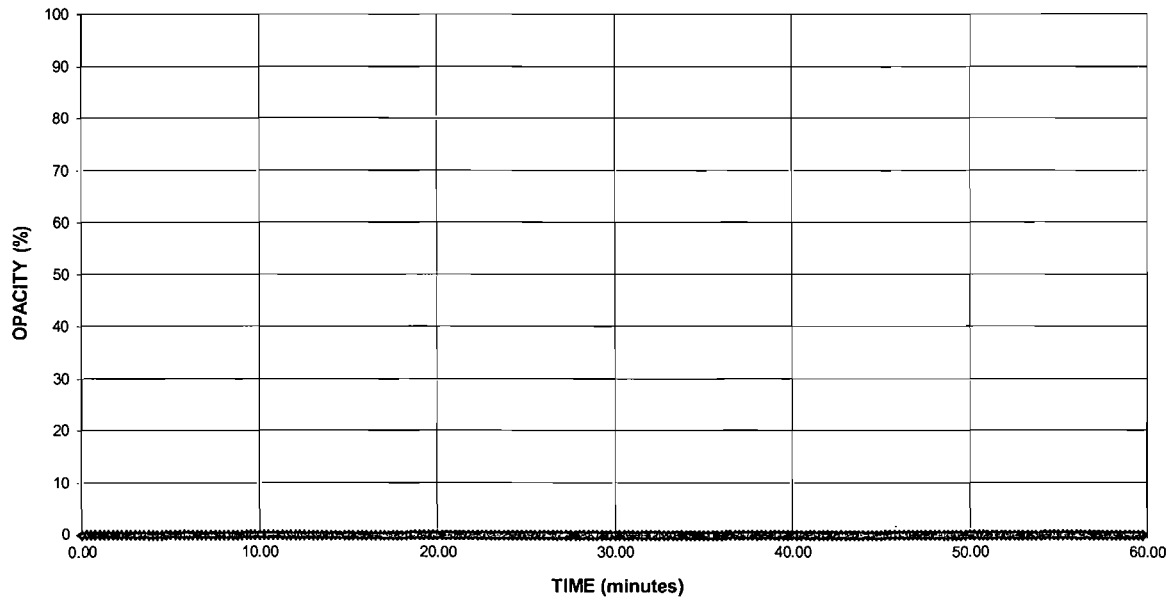
Run 2

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)

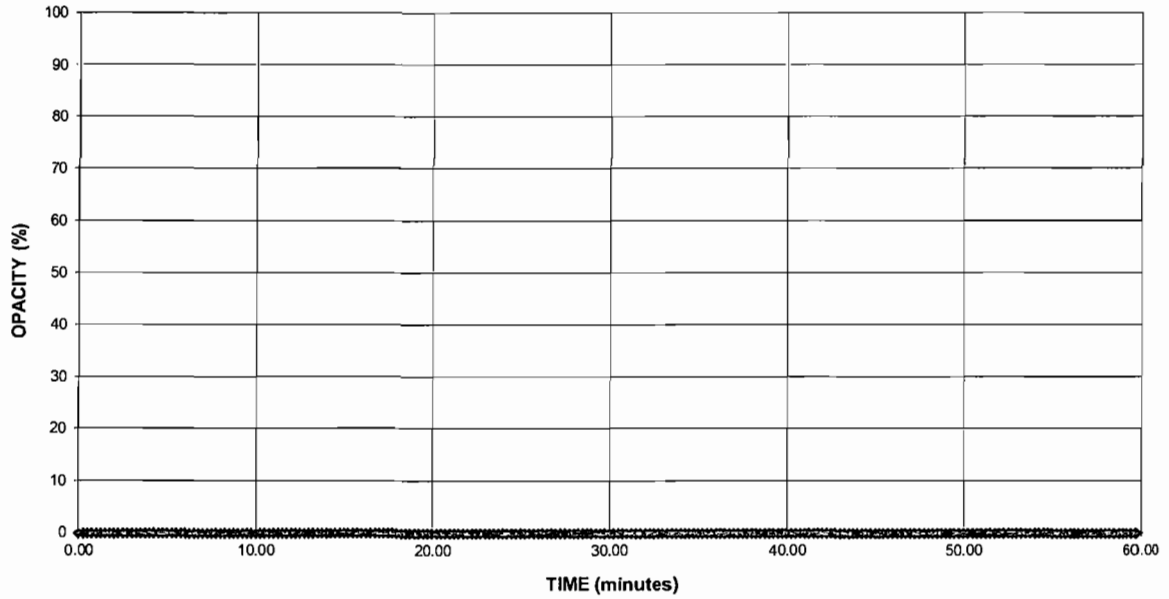


Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 1B Fuel Oil
Location: West County Energy Center
Date: December 19, 2010
Project #: bv-09-westcounty.fl-comp#1

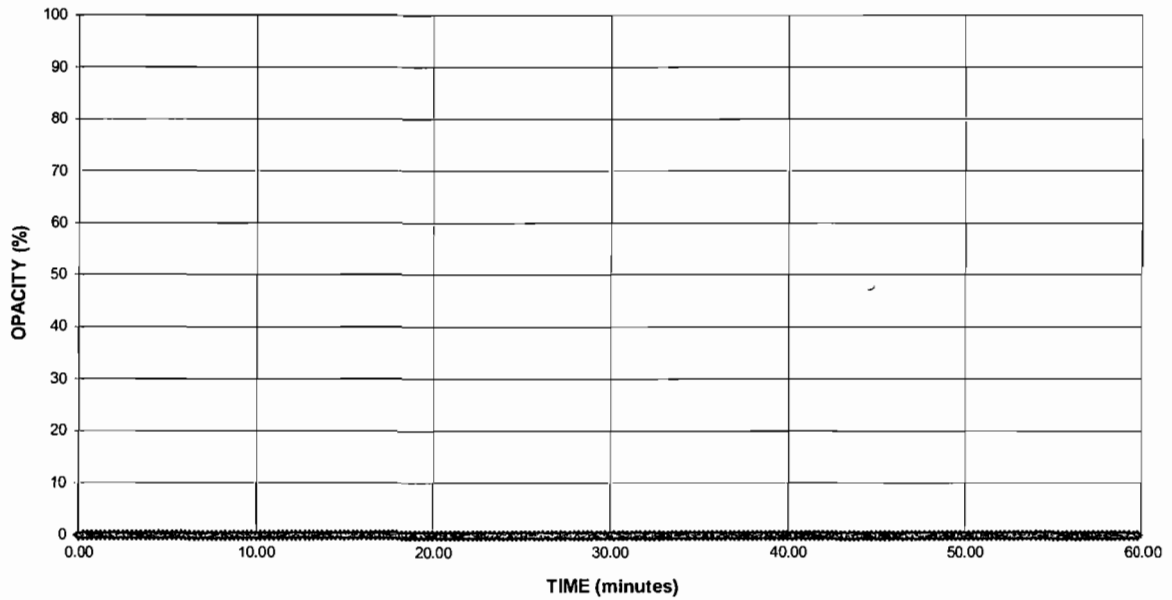
Run 3

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 Energy

Facility Name
Florida Power & Light

Street Address
20505 State Road 80

City State Zip
Loxahatchee FL 33470

Form Number
U1B-FO-R1-1 Page **1** of **2**

Continued on Form Number
U1B-FO-R1-2

Process
Combustion turbine (CTG) Unit # 1B Operating Mode Combined Cycle

Control Equipment
Heat recovery steam generator (HRSG) Operating Mode Normal

Observation Date
12/19/2010 Time Zone
EST Start Time
14:30 End Time
15:30

Describe Emissions Point
Second Northern-most stack Gray colour

Height of Emis. Pt. Start **150'** End **Same** Height of Emis. Pt. Rel. to Observer Start **14'** End **Same**

Distance to Emis. Pt. Start **~500'** End **Same** Direction to Emis. Pt. (Degrees) Start **233° SW** End **Same**

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

Vertical Angle to Obs. Pt. Start **10°** End **Same** Direction to Obs. Pt. (Degrees) Start **233° SW** End **Same**

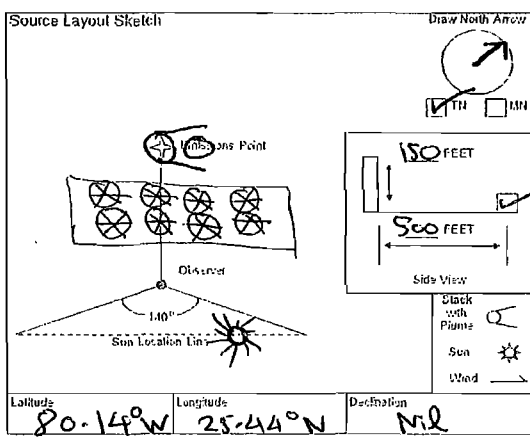
Distance and Direction to Observation Point from Emission Point
 Start **Approx. Same** End **Same**

Describe Emission
 Start **Nil** End **Same** Water Droplet Plume
 Start **Clear** End **Same** Start **Nil** End **Same**

Describe Plume Background
 Start **Cloudy Sky** End **Same** Sky Conditions
 Background Color Start **Gray** End **Same** Start **Overcast** End **Same**

Wind Speed Start **14 mph** End **Same** Wind Direction Start **WNW** End **Same**

Ambient Temp. Start **63°F** End **Same** Wet Bulb Temp. **NA** RH Percent **83%**



Observer's Name (Print)
S. Mukund Venkataratnam Date **12/19/2010**

Observer's Signature
 Date **12/19/2010**

Organization
Air Hygiene Int'l

Certified By
E TA Date **09/22/2010**

Additional Information
ML

Method Used (Circle One)
 Method 9 202A 202B Other: _____

VISUAL EMISSION

Company Name
Black & Veatch Energy

Facility Name
Florida Power & Light

Street Address
20505 State Road 80

City State Zip
Loxahatchee FL 33470

Form Number
U1B-FO-R1-2 2 of 2

Continued on Form Number
NA

Process
CTG Unit # **1B** Operating Mode **Combined Cycle**

Control Equipment
HBSG Operating Mode **Normal**

Obs. No.	Observation Date				Time Zone	Start Time	End Time	Comments
	12/19/2010	15	30	45				
1	0	0	0	0	EST	14:30	15:30	
2	0	0	0	0				
3	0	0	0	0				
4	0	0	0	0				
5	0	0	0	0				
6	0	0	0	0				
7	0	0	0	0				
8	0	0	0	0				
9	0	0	0	0				
10	0	0	0	0				
11	0	0	0	0				
12	0	0	0	0				
13	0	0	0	0				
14	0	0	0	0				
15	0	0	0	0				
16	0	0	0	0				
17	0	0	0	0				
18	0	0	0	0				
19	0	0	0	0				
20	0	0	0	0				
21	0	0	0	0				
22	0	0	0	0				
23	0	0	0	0				
24	0	0	0	0				
25	0	0	0	0				
26	0	0	0	0				
27	0	0	0	0				
28	0	0	0	0				
29	0	0	0	0				
30	0	0	0	0				

Describe Emissions Point
**Second Northmost Stack
Grey colour**

Height of Emiss. Pt. Height of Emiss. Pt. Rel. to Observer
 Start **150'** End **Same** Start **144'** End **Same**

Distance to Emiss. Pt. Direction to Emiss. Pt. (Degrees)
 Start **~500'** End **Same** Start **233°SW** End **Same**

Vertical Angle to Obs. Pt. Direction to Obs. Pt. (Degrees)
 Start **10°** End **Same** Start **235°SW** End **Same**

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

Describe Emissions
 Start **Nil** End **Same**

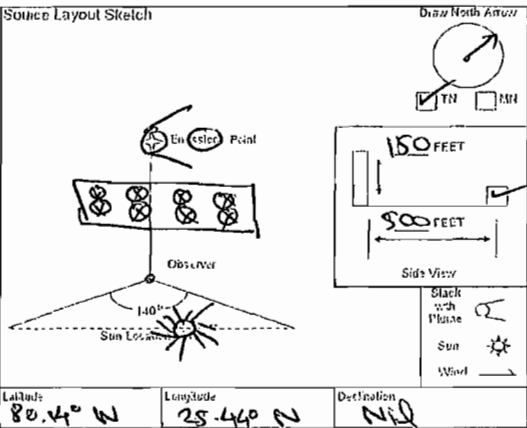
Emission Color Water Droplet Plume
 Start **clear** End **Same** Start **Nil** End **Same**

Describe Plume Background
 Start **cloudy** End **Same**

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

Wind Speed Wind Direction
 Start **14 mph** End **Same** Start **W NW** End **Same**

Ambient Temp. Wet Bulb Temp. RH Percent
 Start **63°F** End **Same** Start **NA** **83%**



Additional Information
NA

Observer's Name (Print)
S. Mukund Venkateshram

Observer's Signature
S. Mukund Venkateshram

Date
12/19/2010

Organization
Air Hygiene Int'l

Certified By
ETA

Date
09/22/10

Method Used (Circle One)
 Method 9 303A 203B Other: _____

VISUAL EMISSIONS OBSERVATION FORM

Company Name
Black & Veatch Energy
 Facility Name
Florida Power & Light
 Street Address
20505 State Road 80
 City State Zip
Loxahatchee FL 33470

Form Number
U1B-FO-R2-1 Page **1** of **2**
 Continued on Form Number
U1B-FO-R2-2

Process
GTG Unit # **1B** Operating Mode
Combined Cycle
 Control Equipment
HRSG Operating Mode
Normal

Observation Date
12/19/10 Time Zone
EST Start Time
15:30 End Time
16:30

Describe Emissions Point
Second Northernmost stack
Grey colour
 Height of Emiss. Pt. Height of Emiss. Pt. Rel. to Observer
 Start **150'** End **Same** Start **144'** End **Same**
 Distance to Emiss. Pt. Direction to Emiss. Pt. (Degrees)
 Start **N 500'** End **Same** Start **233° SW** End **Same**

Obs. No.	0	15	30	45	Comments
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Vertical Angle to Obs. Pt. Direction to Obs. Pt. (Degrees)
 Start **10°** End **Same** Start **233° SW** End **Same**
 Distance and Direction to Observation Point from Emission Point
 Start **Approach Same** End **Same**

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

Describe Emissions
 Start **Nil** End **Same**
 Emission Color
Same Water Droplet Flame
 Start **Clear** End **Same** Start **Nil** End **Same**

Describe Plume Background
 Start **Cloudy** End **Same**
 Background Color
 Start **Gray** End **Same** Sky Conditions
Overcast End **Same**
 Wind Speed
 Start **10 mph** End **Same** Wind Direction
 Start **NNW** End **Same**
 Ambient Temp. Wet Bulb Temp. RH Percent
 Start **63° F** End **Same** **NA** **84%**

Source Layout Sketch
 Draw North Arrow
 TH EM

 Latitude
80.14° W Longitude
25.44° N Direction
ND

Observer's Name (Print)
S. Ambrose Karkatashian Date
12/19/2010

Additional Information
NA

Organization
Air Pollution Int'l Date
09/22/2010
 Certified By
EJA

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

VISUAL EMISSIONS OBSERVATION FORM

Company Name
Black & Veatch Energy

Facility Name
Florida Power & Light

Street Address
20505 State Road 80

City State Zip
Lorahatchee FL 33470

Form Number **U1B-FO-R2-2** Page **2** of **2**

Continued on Form Number **NA**

Observation Date **12/19/10** Time Zone **EST** Start Time **15:30** End Time **16:30**

Process **ETG** Unit # **1B** Operating Mode **Carbonated**

Control Equipment **HRSG** Operating Mode **Normal**

Time	0	15	30	45	Comments
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Describe Emissions Point
Second Northmost stack Gray colour

Height of Emiss. Pt. Start **150'** End **Same** Height of Emiss. Pt. Rel. to Observer Start **144'** End **Same**

Distance to Emiss. Pt. Start **N 500'** End **Same** Direction to Emiss. Pt. (Degrees) Start **233° SW** End **Same**

1	0	0	0	0	
---	---	---	---	---	--

2	0	0	0	0	
---	---	---	---	---	--

3	0	0	0	0	
---	---	---	---	---	--

4	0	0	0	0	
---	---	---	---	---	--

5	0	0	0	0	
---	---	---	---	---	--

6	0	0	0	0	
---	---	---	---	---	--

7	0	0	0	0	
---	---	---	---	---	--

8	0	0	0	0	
---	---	---	---	---	--

9	0	0	0	0	
---	---	---	---	---	--

10	0	0	0	0	
----	---	---	---	---	--

Vertical Angle to Obs. Pt. Start **10°** End **Same** Direction to Obs. Pt. (Degrees) Start **233° SW** End **Same**

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

11	0	0	0	0	
----	---	---	---	---	--

12	0	0	0	0	
----	---	---	---	---	--

13	0	0	0	0	
----	---	---	---	---	--

14	0	0	0	0	
----	---	---	---	---	--

15	0	0	0	0	
----	---	---	---	---	--

16	0	0	0	0	
----	---	---	---	---	--

17	0	0	0	0	
----	---	---	---	---	--

18	0	0	0	0	
----	---	---	---	---	--

19	0	0	0	0	
----	---	---	---	---	--

20	0	0	0	0	
----	---	---	---	---	--

21	0	0	0	0	
----	---	---	---	---	--

22	0	0	0	0	
----	---	---	---	---	--

23	0	0	0	0	
----	---	---	---	---	--

24	0	0	0	0	
----	---	---	---	---	--

25	0	0	0	0	
----	---	---	---	---	--

26	0	0	0	0	
----	---	---	---	---	--

27	0	0	0	0	
----	---	---	---	---	--

28	0	0	0	0	
----	---	---	---	---	--

29	0	0	0	0	
----	---	---	---	---	--

30	0	0	0	0	
----	---	---	---	---	--

Describe Emissions Start **Nil** End **Same**

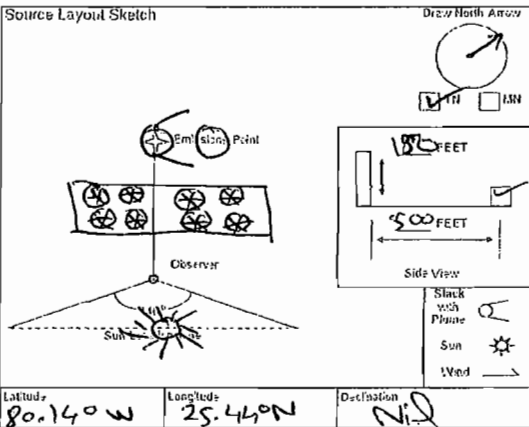
Emission Color **Same** Water Droplet Plume Start **Nil** End **Same**

Describe Plume Background Start **Cloudy** End **Same**

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

Wind Speed Start **10 mph** End **Same** Wind Direction Start **NNW** End **Same**

Ambient Temp. Start **63°F** End **Same** Wet Bulb Temp. **NA** RH Percent **84%**



Observer's Name (Print) **S. Muzund Venkateshram**

Observer's Signature **[Signature]** Date **12/19/2010**

Additional Information
NA

Organization **Ap Hygiene Int'l**

Certified by **ETA** Date **09/22/20**

Method Used (Circle One)
 Method 3 200A 200B Other: _____

VISUAL EMISSIONS OBSERVATION FORM

Company Name: Black Veatch Energy
 Facility Name: Florida Power & Light
 Street Address: 20505 State Road 80
 City: Loxahatchee State: FL Zip: 33470

Form Number: U1B-FO-R3-1 Page 1 of 2
 Continued on Form Number: U1B-FO-R3-2

Process: CTG Unit #: 1B Operating Mode: Combustion
 Control Equipment: HRS G Operating Mode: Normal

Observation Date: 12/19/10 Time Zone: EST Start Time: 16:30 End Time: 17:30

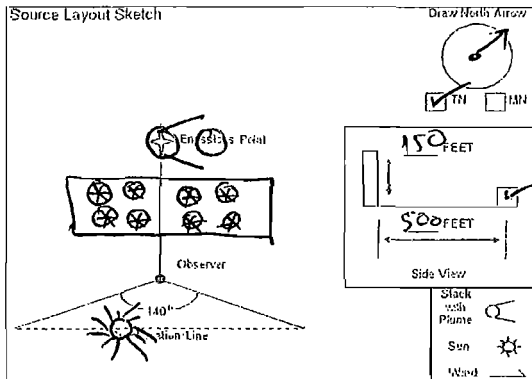
Describe Emissions Point
Second Northernmost stack grey colour
 Height of Emis. Pt. Start: 150' End: Same Height of Emis. Pt. Rel. to Observer Start: 144' End: Same
 Distance to Emis. Pt. Start: N 500' End: Same Direction to Emis. Pt. (Degrees) Start: 233° SW End: Same

Obs. No.	Time				Comments
	0	15	30	45	
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Vertical Angle to Obs. Pt. Start: 10° End: Same Direction to Obs. Pt. (Degrees) Start: 233° SW End: Same
 Distance and Direction to Observation Point from Emission Point Start: Approx. the same End: Same

Describe Emissions
 Start: Nil End: Same
 Emission Color: Water Droplet Plume
 Start: Clear End: Same Start: Nil End: Same

Describe Plume Background
 Start: Cloudy End: Same
 Background Color: Grey End: Same Sky Conditions: Overcast End: Same
 Wind Speed: 10 mph End: Same Wind Direction: WNW End: Same
 Ambient Temp.: 63° F End: Same Wet Bulb Temp.: NA RH Percent: 77%



Latitude: 80.14° W Longitude: 25.41° N Declination: Nil

Observer's Name (Print): S. Mukundan Venkateshwaran
 Observer's Signature: _____ Date: 12/19/2010
 Organization: Air Hygiene Int'l
 Certified By: ETA Date: 09/22/10

Additional Information
NA

Method Used (Circle One)
 Method B 203A 203B Other: _____

Company Name
Black & Veatch Energy
 Facility Name
Florida Power & Light
 Street Address
20505 State Road 80
 City State Zip
Loxahatchee FL 33470

Process
CTG Unit # 1B Operating Mode Combined Cycle
 Control Equipment
HSG Operating Mode Normal

Describe Emission Point
Second Northmost Stack
Gray colour
 Height of Emis. Pt. Height of Emis. Pt. Rel. to Observer
 Start 150' End Same Start 144' End Same
 Distance to Emis. Pt. Direction to Emis. Pt. (Degrees)
 Start N 500' End Same Start 233° South End Same

Vertical Angle to Obs. Pt. Direction to Obs. Pt. (Degrees)
 Start 10° End Same Start 233° SW End Same
 Distance and Direction to Observation Point from Emission Point
 Start Approx 1/2 mile End Same

Describe Emissions
 Start Nil End Same
 Emission Color Water Droplet Plume
 Start Clear End Same Start Nil End Same

Describe Plume Background
 Start Cloudy End Same
 Background Color Sky Conditions
 Start Gray End Same Start Overcast End Same
 Wind Speed Wind Direction
 Start 1 mph End Same Start WNW End Same
 Ambient Temp. Wet Bulb Temp. RH Percent
 Start 63°F End Same NA 77%

Source Layout Sketch

Draw North Arrow

150 FEET

500 FEET

140°

Observer

Side View

Stack with Plume

Sun

Wind

Latitude 80.14° W Longitude 25.44° N Declination Nil

Additional Information
NA

VISUAL EMISSIONS OBSERVATION FORM

Form Number U18-FO-R3-2 Page 2 of 2
 Continued on Form Number NA

Obs. No.	Sec	Time Zone				Comments
		0	15	30	45	
1		0	0	0	0	
2		0	0	0	0	
3		0	0	0	0	
4		0	0	0	0	
5		0	0	0	0	
6		0	0	0	0	
7		0	0	0	0	
8		0	0	0	0	
9		0	0	0	0	
10		0	0	0	0	
11		0	0	0	0	
12		0	0	0	0	
13		0	0	0	0	
14		0	0	0	0	
15		0	0	0	0	
16		0	0	0	0	
17		0	0	0	0	
18		0	0	0	0	
19		0	0	0	0	
20		0	0	0	0	
21		0	0	0	0	
22		0	0	0	0	
23		0	0	0	0	
24		0	0	0	0	
25		0	0	0	0	
26		0	0	0	0	
27		0	0	0	0	
28		0	0	0	0	
29		0	0	0	0	
30		0	0	0	0	

Observer's Name (Print)
S. Mukund Venkateshram
 Observer's Signature
[Signature] Date 12/19/10
 Organization
Air Hygiene Int'l
 Certified By
ETA Date 09/22/10

CALCULATIONS

EXAMPLE CALCULATIONS (INFORMATION)

Specific Humidity (RH_{sp})

Note: RH_{sp} (gr/lb) calculated using temperature, relative humidity, and barometric pressure with psychrometric chart, psychrometric calculator, or built in psychrometric algorithm.

$$RH_{sp} (lb/lb) = \left[\left(\frac{gr}{lb} \right) \times \frac{lb}{7000gr} \right] \quad RH_{sp} = \frac{67.75 \text{ gr}}{lb} \times \frac{1 \text{ lb}}{7000 \text{ gr}} = 0.009678 \frac{\text{lb H}_2\text{O}}{\text{lb Air}}$$

Combustor Inlet Pressure / Compressor Discharge Pressure (CIP / CDP)

(corrected from gauge to atmospheric pres. and conv. to mm Hg.)

Note: CIP / CDP (psig) is a value obtained from the source operator.

$$CIP / CDP = \left[(psig + P) \times \frac{51.71493 \text{ mmHg}}{1 \text{ psi}} \right] \quad CIP / CDP = [273.8 \text{ psig} + 14.6413] \times \frac{51.71493 \text{ mmHg}}{1 \text{ psia}} = 14,917 \text{ mmHg (abs)}$$

EXAMPLE CALCULATIONS (CALIBRATION)

Analyzer Calibration Error

RM 7E, (12-17-09), 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)

$$ACE = \left(\frac{C_{Dr} - C_I}{CS} \right) \times 100 \quad \text{Eq. 7E-1} \quad ACE = \frac{12.41 \text{ ppm} - 12.10 \text{ ppm}}{23.60 \text{ ppm}} \times 100 = 1.31 \%$$

Calibration Error and Estimated Point, RM 25A, THC Analyzer

RM 25A, (12-17-09), 8.4 Calibration Error Test. Immediately prior to the test series (within 2 hours of the start of the test), introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level response. Then introduce low-level and mid-level calibration gases successively to the measurement system. ... These differences must be less than 5 percent of the respective calibration gas value. (calc for THC analyzer mid gas, if applicable)

$$E_p = \frac{C_{Dr(H)} - C_{Dr(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dr(M)} + C_{Dr(Z)} \quad \text{Eq. of a line } y=mx+b \quad E_p = \frac{8.49 \text{ ppm} - -0.01 \text{ ppm}}{8.46 \text{ ppm} - 0.00 \text{ ppm}} \times 4.76 \text{ ppm} + -0.01 = 4.77 \text{ ppm}$$

$$ACE = \left(\frac{C_{Dr} - C_I}{CS} \right) \times 100 \quad \text{Eq. 7E-1} \quad ACE_{THC} = \frac{4.98 \text{ ppm} - 4.77 \text{ ppm}}{4.76 \text{ ppm}} \times 100 = 4.36 \%$$

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

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

System Bias

RM 7E, (12-17-09), 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)

$$SB = \left(\frac{C_s - C_{Dir}}{CS} \right) \times 100 \quad \text{Eq. 7E-2} \quad SB = \frac{12.15 \text{ ppm} - 12.41 \text{ ppm}}{23.60 \text{ ppm}} \times 100 = -1.10 \%$$

Drift Assessment

RM 7E, (12-17-09), 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)

$$D = |SB_{final} - SB_i| \quad \text{Eq. 7E-4} \quad D = | -0.76 \% - -1.10 \% | = 0.34 \%$$

Alternative Drift and Bias

RM 7E, (12-17-09), 13.2 / 13.3 System Bias and Drift. Alternatively, the results are acceptable if |Cs - Cdir| is ≤ 0.5 ppmv or if |Cs - Cv| is ≤ 0.5 ppmv (as applicable). (calc for NOx analyzer initial upscale, Run 1, if applicable)

$$SB / D_{Alt} = |C_s - C_{Dir}| \quad \text{Eq. Section 13.2 and 13.3} \quad SB / D_{Alt} = | 12.15 \text{ ppm} - 12.41 \text{ ppm} | = 0.26 \text{ ppm}$$

Bias Adjusted Average

RM 7E, (12-17-09), 12.6 Effluent Gas Concentration. For each test run, calculate Cavg, the arithmetic average of all valid NOx concentration values (e.g., 1-minute averages). Then adjust the value of Cavg for bias, using Equation 7E-5b. (calc for NOx analyzer, Run 1, if applicable)

$$C_{Gas} = (C_{Avg} - C_o) \times \left(\frac{C_{MM}}{C_M - C_o} \right) \quad \text{Eq. 7E-5b} \quad C_{Gas} = \left(7.56 \text{ ppm} - 0.06 \text{ ppm} \right) \times \left(\frac{12.10 \text{ ppm}}{12.19 \text{ ppm} - 0.06 \text{ ppm}} \right) = 7.48 \text{ ppm}$$

EXAMPLE CALCULATIONS (RUNS)

Stack Exhaust Flow (Qs) - RM19

$$Q_s = \left(\frac{FFactor \times Q_f \times HHV}{1,000,000} \right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O_2)}} \right) \quad Q_s = \frac{9,201.99 \text{ SCF}}{\text{MMBtu}} \times \frac{2,209.33 \text{ SCF}}{\text{hr}} \times \frac{1,076,179.83 \text{ Btu}}{\text{SCF}} \times \frac{\text{MMBtu}}{10^6 \text{ Btu}} \times \left(\frac{20.90\%}{20.9\% - 13.4 \%} \right) = 61,005,021.96 \text{ SCFH}$$

Diluent-Corrected Pollutant Concentration, O2 Based

RM 20, (11-26-02), 7.3.1 Correction of Pollutant Concentration Using O2 Concentration. Calculate the O2 corrected pollutant concentration, as follows: (calc for NOx gas, Run 1, if applicable)

$$C_{adj} = C_{Gas(T_{air}, t)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O_2)}} \right) \quad \text{Eq. 20-4} \quad C_{adj} = 7.48 \text{ ppm} \times \left(\frac{20.9\% - 15.00 \%}{20.9\% - 13.40 \%} \right) = 5.89 \text{ ppm@15\%O}_2$$

Diluent-Corrected Polutant Concentration Corrected to ISO Conditions

40CFR60.335(b)(1), Conversion for conc. at ISO Conditions (68°F, 1 atm). Calculate, as follows: (calc for NOx@15% with Run 1 data, if applicable)

$$C_{ISO} = C_{Adj} \times \sqrt{\frac{P_r}{P_o}} \times e^{(19 \times (110 - 0.00633))} \times \left(\frac{288}{T_a} \right)^{1.53} \quad C_{ISO} = 5.89 \text{ ppm@15\%O}_2 \times \left(\sqrt{\frac{273.8 \text{ psig} + 14.69232 \text{ psi}}{273.8 \text{ psig} + 14.6413 \text{ psi}}} \right) \times 2.718 \times \left(\frac{288 \text{ K}}{290 \text{ K}} \right)^{1.53} = 6.21 \text{ ppm@15\% and ISO}$$

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

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

Calculation for pound per hour emission rate. Calculate, as follows: (calc for NOx gas Run 1, if applicable)

$$E_{lb/hr} = \frac{C_{Gas} \times Q_S \times MW}{10^6 \times G} \qquad E_{lb/hr} = \frac{7.48 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{57,294,020 \text{ SCFH} \times 46.01 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{51.21 \text{ lb}}{\text{hr}}$$

Emissions Rate (ton/year)

Calculation for tons per year emission rate based on 500 hours per year. Calculate, as follows: (calc for NOx gas Run 1, if applicable)

$$E_{ton/yr} = \frac{E_{lb/hr} \times hr_{year}}{2000} \qquad E_{ton/yr} = \frac{51.21 \text{ lb}}{\text{hr}} \times \frac{500 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}} = \frac{12.80 \text{ ton}}{\text{year}}$$

Emissions Rate (lb/MMBtu)

RM 19, (12-17-09), 12.2 Emission Rates of PM, SO₂, and NOx. Select from the following sections the applicable procedure to compute the PM, SO₂, 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 O₂ (%O₂d) and pollutant (Cd) concentrations, use the following equation:

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

$$E_{lb/MMBtu} = \frac{7.48 \text{ ppm} \times 9,201.99 \text{ SCF/MMBtu} \times 0.0000001194 \text{ lb/ppm} \cdot \text{ft}^3 \times 20.9\%}{20.9\% - 13.40\%} = \frac{0.023 \text{ lb}}{\text{MMBtu}}$$

Conversion Constant

Conv_c for NOx

$$Conv_c (lb / ppm \cdot ft^3) = \frac{MW}{10^6} \qquad Conv_c = \frac{46.01 \text{ lb}}{\text{lb} \cdot \text{mole}} \times \frac{\text{lb} \cdot \text{mole}}{385.23 \text{ SCF}} = \frac{0.0000001194 \text{ lb}}{\text{ppm} \cdot \text{ft}^3}$$

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_{WIS} = Moisture content of sample gas as measured by Method 4 or other approved method, percent/100.
C_{AVG} = Average unadjusted gas concentration indicated by data recorder for the test run.
C_D = Pollutant concentration adjusted to dry conditions.
C_{D_{cal}} = Measured concentration of a calibration gas (low, mid, or high) when introduced in direct calibration mode.
C_{Gas} = Average effluent gas concentration adjusted for bias.
C_M = Average of initial and final system calibration bias (or 2-point system calibration error) check responses for the upscale calibration gas.
C_{MA} = Actual concentration of the upscale calibration gas, ppmv.
C_O = 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_S = Measured concentration of a calibration gas (low, mid, or high) when introduced in system calibration mode.
C_{SS} = Concentration of NO_x measured in the spiked sample.
C_{Spike} = Concentration of NO_x in the undiluted spike gas.
C_{calc} = Calculated concentration of NO_x in the spike gas diluted in the sample.
C_V = Manufacturer certified concentration of a calibration gas (low, mid, or high).
C_W = Pollutant concentration measured under moist sample conditions, wet basis.
CS = Calibration span.
D = Drift assessment, percent of calibration span.
E_p = 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_{NO₂} = NO₂ to NO converter efficiency, percent.
H = High calibration gas, designator.
L = Low calibration gas, designator.
M = Mid calibration gas, designator.
NO_{Final} = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.
NO_XCorr = The NO_x concentration corrected for the converter efficiency.
NO_XFinal = The final NO_x concentration observed during the converter efficiency test in Section 16.2.2.
NO_XPeak = The highest NO_x concentration observed during the converter efficiency test in Section 16.2.2.
Q_{Spike} = Flow rate of spike gas introduced in system calibration mode, L/min.
Q_{Total} = Total sample flow rate during the spike test, L/min.
R = Spike recovery, percent.
SB = System bias, percent of calibration span.
SB_i = Pre-run system bias, percent of calibration span.
SB_f = Post-run system bias, percent of calibration span.
SB / D_{Alt} = Alternative absolute difference criteria to pass bias and/or drift checks.
SCE = System calibration error, percent of calibration span.
SCE_i = Pre-run system calibration error, percent of calibration span.
SCE_{final} = 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_r = reference combustor inlet absolute pressure at 101.3 kilopascals ambient pressure, mm Hg
P_o = observed combustor inlet absolute pressure at test, mm Hg
H_o = observed humidity of ambient air, g H₂O/g air
e = transcendental constant, 2.718
T_a = 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_{oi}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).
 E_{si} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).
 E_{so} = 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_s = 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 SO₂ 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 O₂.
 E_{pa}, E_{pi} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O₂.
 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 O₂.
 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, scm³/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).
 $\%_H$ = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.
 H_s = 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).
 $\%_{H2O}$ = 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)/(%) [10^5 Btu/million Btu].
 K_c = (9.57 scm³/kg)/% [(1.53 scf/lb)/%].
 K_{cc} = (2.0 scm³/kg)/% [(0.321 scf/lb)/%].
 K_{cd} = (22.7 scm³/kg)/% [(3.64 scf/lb)/%].
 K_{cw} = (34.74 scm³/kg)/% [(5.57 scf/lb)/%].
 K_{ci} = (0.86 scm³/kg)/% [(0.14 scf/lb)/%].
 K_{cs} = (2.85 scm³/kg)/% [(0.46 scf/lb)/%].
 K_{cs} = (3.54 scm³/kg)/% [(0.57 scf/lb)/%].
 K_{whf} = 2×10^4 Btu/M³-MMBtu
 K_{wi} = (1.30 scm³/kg)/% [(0.21 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)¹
 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 SO₂ emissions, percent.
 $\%_S$ = Sulfur content of as-fired fuel lot, dry basis, weight percent.
 S_d = Standard deviation of the hourly average pollutant rates for each performance test period, ng/J (lb/million Btu).
 $\%_{Sf}$ = Concentration of sulfur from an ultimate analysis of fuel, weight percent.
 $S(wt\%)$ = 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 Factor = 1.0236 = conv. at 14.696 psia and
 68 deg F (ref. Civil Eng. Ref. Manual, 7th Ed.)
 X_{CO2} = CO₂ 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 NO_x (lb/lb-mole) = 46.01
 Molecular Weight of CO (lb/lb-mole) = 28.00
 Molecular Weight of SO₂ (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 NH₃ (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 NO_x = 0.0000001194351
 Conversion Constant for CO = 0.0000000726839
 Conversion Constant for SO₂ = 0.0000001661345
 Conversion Constant for THC = 0.0000001142175
 Conversion Constant for VOC (methane) = 0.0000000415336
 Conversion Constant for NH₃ = 0.0000000442074
 Conversion Constant for HCHO = 0.0000000779534

NOTE: units are lb/ppm*ft³

Formulas:

1. Corrected Raw Average (C_{Gas}), 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 % O₂, 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 % O₂ 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 (O₂ 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

Air Permit # :	PSD-FL-354
Plant Name or Location:	West County Energy Center
Date:	December 19-20, 2010
Project Number:	bv-09-westcounty.fl-comp#1
Manufacturer & Equipment:	Mitsubishi
Model:	501G
Unit Number:	1B
Test Load:	Base Load
Tester(s) / Test Unit(s):	JRF/MV/AS/206

		RUN		
	UNITS	1-1	1-2	1-3
Start Time	hh:mm:ss	16:10:22	13:06:03	16:30:03
End Time	hh:mm:ss	17:09:52	14:05:33	17:29:33
Bar. Pressure	in. Hg	29.81	29.97	30.01
Amb. Temp.	°F	62	71	68
Rel. Humidity	%	81	44	52
Spec. Humidity	lb water / lb air	0.009678	0.007212	0.007559
Date	mm/dd/yy	12/19/10	12/20/10	12/20/10
Load Designator		Fuel Oil	Fuel Oil	Fuel Oil
Comb. Inlet Pres.	psig	273.8	271.9	274.7
Turbine Fuel Flow	gal/hr	16,527	16,331	16,589
Total Fuel Flow	SCFH	2,209	2,183	2,218
Stack Moisture	% Method 4	9.1	7.8	8.0
Power Output	megawatts	233.1	229.1	233.5

UNIT OPERATION PARAMETERS

Fuel Oil

RUN 1

start stop	Combustor Inlet		Compressor			ST Load MW	Ambient Temp. B deg F	Barometric Pressure B psia	Ambient R.H. B %RH
	12/19/2010 16:10 12/19/2010 17:09	Pressure B psig	Discharge Pressure B inH2O	CT B Fuel Oil Flow lb/hr	CT B Load MW				
19-Dec-10 16:10:00	273.39	12.32	120587.95	233.43	236.58	63.77	14.63	75.01	
19-Dec-10 16:11:00	272.82	12.34	120360.15	230.99	236.81	63.61	14.63	75.33	
19-Dec-10 16:12:00	273.14	12.32	120708.84	232.49	236.65	63.55	14.64	75.60	
19-Dec-10 16:13:00	273.63	12.37	120588.02	234.29	236.65	63.33	14.64	75.74	
19-Dec-10 16:14:00	273.09	12.30	120635.42	230.66	236.32	63.36	14.64	76.30	
19-Dec-10 16:15:00	273.18	12.28	120665.01	232.49	236.38	63.33	14.64	76.38	
19-Dec-10 16:16:00	273.17	12.22	120358.70	232.06	236.55	63.31	14.64	76.50	
19-Dec-10 16:17:00	273.03	12.33	120704.02	232.32	236.38	63.33	14.64	76.72	
19-Dec-10 16:18:00	273.77	12.23	120754.09	233.89	236.65	63.24	14.64	76.61	
19-Dec-10 16:19:00	272.18	12.22	120446.84	229.28	237.12	63.19	14.64	77.17	
19-Dec-10 16:20:00	273.23	12.16	120694.32	232.32	236.79	63.09	14.64	77.20	
19-Dec-10 16:21:00	273.56	12.30	120342.01	231.90	236.96	63.24	14.64	77.56	
19-Dec-10 16:22:00	272.94	12.20	120666.61	231.52	237.19	63.27	14.64	77.57	
19-Dec-10 16:23:00	273.61	12.36	120924.40	234.34	236.92	63.29	14.64	77.31	
19-Dec-10 16:24:00	272.83	12.26	120381.74	230.63	236.92	63.27	14.64	77.32	
19-Dec-10 16:25:00	273.07	12.30	120610.23	232.20	236.95	63.18	14.64	77.21	
19-Dec-10 16:26:00	273.48	12.17	120600.83	232.98	237.02	63.16	14.64	77.38	
19-Dec-10 16:27:00	273.13	12.25	120765.78	232.76	236.65	63.11	14.64	77.45	
19-Dec-10 16:28:00	273.77	12.29	120624.14	234.21	236.65	62.99	14.64	77.74	
19-Dec-10 16:29:00	272.62	12.25	120491.09	229.24	236.55	62.94	14.64	78.05	
19-Dec-10 16:30:00	273.33	12.25	120859.78	233.03	236.65	62.86	14.64	78.44	
19-Dec-10 16:31:00	273.52	12.25	120592.86	231.89	236.65	62.78	14.64	78.71	
19-Dec-10 16:32:00	272.92	12.31	120633.70	231.66	236.45	62.71	14.64	79.28	
19-Dec-10 16:33:00	273.73	12.37	120694.01	234.12	236.38	62.86	14.64	79.29	
19-Dec-10 16:34:00	273.36	12.24	120626.11	231.21	236.42	62.86	14.64	79.39	
19-Dec-10 16:35:00	273.47	12.28	120766.84	232.29	236.35	62.86	14.64	79.33	
19-Dec-10 16:36:00	273.91	12.22	120648.89	233.92	236.38	62.84	14.64	79.49	
19-Dec-10 16:37:00	272.99	12.28	120833.98	229.93	236.19	62.71	14.64	79.55	
19-Dec-10 16:38:00	273.67	12.34	120874.05	232.76	235.85	62.64	14.64	79.92	
19-Dec-10 16:39:00	273.82	12.29	120670.88	232.61	235.92	62.72	14.64	79.88	
19-Dec-10 16:40:00	273.49	12.35	120808.48	232.55	236.12	62.55	14.64	79.67	
19-Dec-10 16:41:00	273.84	12.45	121155.46	233.91	236.35	62.50	14.64	80.24	
19-Dec-10 16:42:00	273.73	12.36	121056.87	231.00	235.85	62.42	14.64	80.54	
19-Dec-10 16:43:00	273.44	12.33	120900.89	232.87	235.77	62.33	14.64	80.43	
19-Dec-10 16:44:00	274.29	12.38	120747.99	234.71	235.85	62.20	14.64	80.90	
19-Dec-10 16:45:00	273.03	12.40	120876.02	232.35	235.88	62.05	14.64	81.24	
19-Dec-10 16:46:00	274.49	12.41	121308.91	235.09	235.58	61.97	14.64	81.81	
19-Dec-10 16:47:00	274.22	12.45	120661.50	232.89	235.58	61.94	14.64	82.29	
19-Dec-10 16:48:00	273.60	12.37	121164.05	233.22	235.58	61.84	14.64	82.33	
19-Dec-10 16:49:00	274.49	12.40	121189.41	235.42	235.22	61.79	14.64	82.70	
19-Dec-10 16:50:00	273.35	12.35	120996.61	229.91	235.05	61.62	14.64	82.85	
19-Dec-10 16:51:00	274.05	12.27	121157.05	233.82	235.05	61.59	14.64	83.60	
19-Dec-10 16:52:00	274.39	12.32	121072.14	233.65	234.95	61.59	14.64	83.77	
19-Dec-10 16:53:00	274.27	12.37	121220.96	233.59	234.58	61.55	14.64	83.90	
19-Dec-10 16:54:00	275.07	12.39	121138.97	236.76	234.78	61.48	14.64	83.87	
19-Dec-10 16:55:00	274.10	12.47	121308.40	232.21	234.65	61.39	14.64	84.11	
19-Dec-10 16:56:00	274.32	12.42	121317.50	234.36	234.78	61.23	14.64	84.29	
19-Dec-10 16:57:00	274.88	12.45	121131.91	234.30	234.58	61.16	14.64	84.73	
19-Dec-10 16:58:00	274.58	12.47	121393.54	233.94	234.78	61.14	14.64	84.97	
19-Dec-10 16:59:00	275.34	12.45	121522.83	236.40	234.53	61.08	14.64	85.25	
19-Dec-10 17:00:00	274.87	12.43	121432.37	233.41	234.28	61.07	14.64	85.29	
19-Dec-10 17:01:00	274.74	12.47	121405.59	234.32	234.25	61.02	14.64	85.33	
19-Dec-10 17:02:00	275.07	12.50	121324.64	235.36	234.25	60.96	14.64	85.59	
19-Dec-10 17:03:00	274.18	12.43	121681.49	233.66	234.29	60.95	14.64	85.51	
19-Dec-10 17:04:00	274.75	12.35	121652.08	235.33	234.15	60.91	14.64	85.58	
19-Dec-10 17:05:00	275.21	12.45	121342.03	237.30	233.75	60.97	14.64	86.01	
19-Dec-10 17:06:00	274.19	12.39	121364.09	233.48	233.98	60.98	14.64	85.74	
19-Dec-10 17:07:00	274.82	12.48	121488.27	235.54	234.65	60.85	14.64	85.56	
19-Dec-10 17:08:00	274.39	12.27	121396.95	232.99	234.65	60.86	14.64	86.00	
19-Dec-10 17:09:00	274.68	12.45	121579.01	234.76	234.94	60.81	14.64	85.82	
Average	273.80	12.34	120931.79	233.11	235.78	62.30	14.64	80.66	

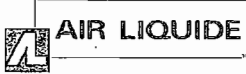
RUN 2

start stop	Combustor Inlet		Compressor			CT B Load MW	ST Load MW	Ambient Temp. B deg F	Barometric Pressure B psia	Ambient R.H. B %RH
	12/20/2010 13:06 12/20/2010 14:05	Pressure B psig	Discharge Pressure B	CT B	Fuel Oil Flow lb/hr					
20-Dec-10 13:06:00	272.33	12.35	119836.48	227.73	247.98	69.85	14.73	45.64		
20-Dec-10 13:07:00	272.87	12.36	119972.67	231.33	247.98	70.02	14.73	45.38		
20-Dec-10 13:08:00	272.61	12.35	119993.65	229.68	248.08	70.40	14.72	45.07		
20-Dec-10 13:09:00	272.47	12.38	119847.88	230.51	248.08	70.32	14.73	45.13		
20-Dec-10 13:10:00	273.01	12.44	119658.35	228.49	248.19	70.19	14.73	44.21		
20-Dec-10 13:11:00	273.02	12.30	120371.12	231.51	248.61	70.13	14.73	44.53		
20-Dec-10 13:12:00	272.79	12.32	119917.95	226.79	248.58	70.86	14.73	44.09		
20-Dec-10 13:13:00	272.89	12.34	119837.26	231.76	248.08	70.38	14.73	44.55		
20-Dec-10 13:14:00	272.52	12.29	119916.25	229.40	248.55	70.51	14.72	44.54		
20-Dec-10 13:15:00	272.58	12.36	120190.17	231.71	248.66	70.40	14.73	45.17		
20-Dec-10 13:16:00	272.40	12.34	119469.17	227.79	248.85	70.49	14.72	44.39		
20-Dec-10 13:17:00	272.40	12.32	119965.95	230.83	248.41	69.97	14.72	46.26		
20-Dec-10 13:18:00	272.24	12.35	119675.55	229.20	248.61	70.31	14.72	47.86		
20-Dec-10 13:19:00	272.07	12.33	119650.94	229.98	248.61	70.33	14.72	45.42		
20-Dec-10 13:20:00	271.93	12.39	119377.55	228.03	248.83	70.50	14.72	46.27		
20-Dec-10 13:21:00	271.70	12.39	119615.23	229.59	248.88	70.97	14.72	47.48		
20-Dec-10 13:22:00	272.04	12.37	119339.03	229.35	249.15	71.43	14.72	45.22		
20-Dec-10 13:23:00	271.55	12.37	119135.07	228.54	248.92	71.07	14.72	44.18		
20-Dec-10 13:24:00	272.26	12.29	119716.79	231.53	248.65	70.84	14.72	46.60		
20-Dec-10 13:25:00	271.83	12.44	119336.45	227.87	249.07	70.78	14.72	44.06		
20-Dec-10 13:26:00	272.41	12.33	119681.48	230.27	249.15	71.10	14.72	44.32		
20-Dec-10 13:27:00	272.79	12.45	119905.05	230.52	248.61	71.46	14.72	43.93		
20-Dec-10 13:28:00	272.16	12.35	119495.02	229.32	248.27	71.60	14.72	43.04		
20-Dec-10 13:29:00	272.71	12.52	119661.30	230.10	248.01	71.74	14.72	42.55		
20-Dec-10 13:30:00	272.43	12.33	119913.27	230.01	247.28	71.23	14.72	42.62		
20-Dec-10 13:31:00	272.86	12.45	119790.60	231.54	247.01	70.97	14.72	42.90		
20-Dec-10 13:32:00	272.34	12.41	120183.84	228.46	246.48	70.98	14.72	43.57		
20-Dec-10 13:33:00	272.61	12.35	119889.69	231.42	246.21	71.40	14.72	42.91		
20-Dec-10 13:34:00	271.81	12.22	119517.48	226.51	245.53	71.16	14.72	42.53		
20-Dec-10 13:35:00	272.54	12.27	120020.07	230.59	245.51	70.73	14.72	42.95		
20-Dec-10 13:36:00	272.82	12.24	119783.48	231.05	245.04	70.46	14.72	43.94		
20-Dec-10 13:37:00	271.87	12.39	119630.81	229.66	245.10	70.66	14.72	42.97		
20-Dec-10 13:38:00	272.46	12.28	119598.58	230.60	246.48	70.57	14.72	44.24		
20-Dec-10 13:39:00	271.91	12.18	119834.23	229.66	246.98	71.19	14.72	43.61		
20-Dec-10 13:40:00	272.25	12.22	119211.40	230.41	246.48	71.28	14.72	42.26		
20-Dec-10 13:41:00	271.46	12.37	119642.55	228.90	245.94	71.35	14.72	42.82		
20-Dec-10 13:42:00	272.07	12.20	119503.23	230.04	245.08	71.44	14.72	41.92		
20-Dec-10 13:43:00	271.81	12.26	119179.66	226.76	244.35	71.45	14.72	41.88		
20-Dec-10 13:44:00	272.03	12.25	120043.19	230.16	244.18	71.84	14.72	41.81		
20-Dec-10 13:45:00	272.05	12.24	119220.95	229.55	244.28	71.77	14.72	41.17		
20-Dec-10 13:46:00	271.49	12.26	119494.55	229.44	243.27	71.69	14.72	42.50		
20-Dec-10 13:47:00	272.41	12.25	119752.73	231.71	242.34	71.72	14.72	41.77		
20-Dec-10 13:48:00	271.10	12.28	119013.34	225.66	241.89	71.83	14.72	41.06		
20-Dec-10 13:49:00	272.21	12.38	119543.47	230.10	241.17	71.68	14.72	40.75		
20-Dec-10 13:50:00	272.43	12.38	119798.52	229.12	240.72	71.73	14.72	40.63		
20-Dec-10 13:51:00	272.02	12.35	119624.36	229.99	240.34	71.99	14.72	40.48		
20-Dec-10 13:52:00	271.76	12.24	119264.73	228.22	239.86	72.46	14.72	40.15		
20-Dec-10 13:53:00	271.79	12.33	119794.93	230.00	239.86	72.87	14.72	39.71		
20-Dec-10 13:54:00	272.31	12.33	119558.92	230.58	240.01	72.96	14.72	39.72		
20-Dec-10 13:55:00	270.80	12.27	119101.33	224.65	239.86	72.44	14.72	41.08		
20-Dec-10 13:56:00	271.46	12.06	119641.86	229.77	239.05	72.59	14.72	41.47		
20-Dec-10 13:57:00	271.42	12.15	118861.14	226.34	239.21	73.10	14.72	40.09		
20-Dec-10 13:58:00	271.59	12.24	119327.28	229.25	238.82	72.46	14.72	40.73		
20-Dec-10 13:59:00	271.92	12.35	119369.13	230.52	238.72	72.38	14.72	41.49		
20-Dec-10 14:00:00	270.43	12.21	119244.27	227.50	238.25	72.61	14.72	46.05		
20-Dec-10 14:01:00	269.24	12.06	118332.68	226.63	238.79	73.66	14.72	56.06		
20-Dec-10 14:02:00	268.25	11.86	117991.95	222.62	238.79	74.36	14.72	62.22		
20-Dec-10 14:03:00	268.90	12.06	118219.30	225.87	239.01	74.52	14.72	56.32		
20-Dec-10 14:04:00	270.70	12.18	117796.17	227.50	238.32	74.80	14.72	54.20		
20-Dec-10 14:05:00	270.48	12.22	117824.58	225.47	237.99	73.61	14.72	38.78		
Average	271.93	12.30	119501.41	229.13	244.88	71.49	14.72	44.15		

RUN 3

start stop	Combustor Inlet		Compressor			Ambient	Barometric	Ambient
	12/20/2010 16:30 12/20/2010 17:29	Pressure B psig	Discharge Pressure B inH2O	CT B Fuel Oil Flow lb/hr	CT B Load MW	ST Load MW	Temp. B deg F	Pressure B psia
20-Dec-10 16:30:00	272.61	12.11	119986.69	230.57	234.32	70.54	14.74	46.46
20-Dec-10 16:31:00	272.28	12.31	120618.21	229.48	233.98	70.39	14.74	46.70
20-Dec-10 16:32:00	273.04	12.24	120488.45	232.52	234.48	69.88	14.74	47.03
20-Dec-10 16:33:00	272.48	12.18	120137.05	228.34	234.25	69.90	14.74	48.31
20-Dec-10 16:34:00	272.79	12.23	120464.48	231.26	234.25	69.78	14.74	47.96
20-Dec-10 16:35:00	273.28	12.16	120367.92	232.85	234.18	69.39	14.74	48.18
20-Dec-10 16:36:00	272.76	12.17	120849.84	232.34	234.52	69.28	14.74	48.78
20-Dec-10 16:37:00	273.13	12.35	120608.21	233.10	234.52	69.48	14.74	48.51
20-Dec-10 16:38:00	272.28	12.34	120699.30	231.01	234.32	69.63	14.74	50.40
20-Dec-10 16:39:00	272.48	12.25	120445.24	231.88	234.52	69.98	14.74	49.58
20-Dec-10 16:40:00	272.68	12.24	120048.30	231.34	234.58	70.21	14.74	50.06
20-Dec-10 16:41:00	272.29	12.20	120691.77	230.56	234.03	70.35	14.74	51.42
20-Dec-10 16:42:00	273.00	12.30	120513.98	233.62	235.05	70.22	14.74	49.51
20-Dec-10 16:43:00	272.81	12.41	120468.20	228.86	235.22	70.20	14.74	48.39
20-Dec-10 16:44:00	272.80	12.27	120606.43	232.22	234.68	70.17	14.74	48.56
20-Dec-10 16:45:00	273.35	12.33	120655.52	233.59	235.05	70.03	14.73	49.09
20-Dec-10 16:46:00	272.51	12.17	120695.69	230.64	234.52	69.83	14.74	49.28
20-Dec-10 16:47:00	273.00	12.30	120835.58	233.59	234.57	69.91	14.74	51.04
20-Dec-10 16:48:00	272.40	12.36	120604.58	228.27	234.52	69.98	14.74	51.33
20-Dec-10 16:49:00	272.77	12.32	120633.57	232.15	234.72	69.90	14.74	50.46
20-Dec-10 16:50:00	273.66	12.33	120908.50	233.65	234.90	69.88	14.74	50.12
20-Dec-10 16:51:00	273.03	12.22	121021.84	232.79	235.05	69.56	14.74	49.91
20-Dec-10 16:52:00	273.63	12.24	120708.94	234.07	235.05	69.53	14.74	49.95
20-Dec-10 16:53:00	272.72	12.36	120895.48	229.96	235.05	69.57	14.74	49.36
20-Dec-10 16:54:00	274.08	12.49	121205.33	234.30	235.02	69.31	14.74	49.33
20-Dec-10 16:55:00	273.84	12.38	120983.69	231.37	234.79	69.22	14.74	49.96
20-Dec-10 16:56:00	273.91	12.30	121090.59	233.03	233.87	69.16	14.74	49.75
20-Dec-10 16:57:00	274.91	12.40	121079.68	233.12	234.52	68.89	14.74	50.89
20-Dec-10 16:58:00	274.91	12.34	121724.84	233.46	234.74	68.54	14.74	51.20
20-Dec-10 16:59:00	276.01	12.46	121615.60	235.48	233.98	68.18	14.74	51.58
20-Dec-10 17:00:00	275.49	12.45	121312.05	231.42	234.52	67.98	14.74	51.59
20-Dec-10 17:01:00	276.08	12.40	122194.63	235.77	234.74	67.82	14.74	51.63
20-Dec-10 17:02:00	276.60	12.47	122027.45	236.18	234.28	67.62	14.74	51.36
20-Dec-10 17:03:00	275.19	12.39	121822.55	234.51	234.52	67.60	14.74	51.36
20-Dec-10 17:04:00	276.41	12.53	121876.25	235.72	234.52	67.39	14.74	51.43
20-Dec-10 17:05:00	275.74	12.52	122289.16	233.80	234.63	66.92	14.74	52.54
20-Dec-10 17:06:00	276.31	12.47	122124.66	235.68	234.78	66.66	14.74	53.16
20-Dec-10 17:07:00	276.74	12.67	121801.17	236.09	234.78	66.68	14.74	53.87
20-Dec-10 17:08:00	275.74	12.44	122026.00	233.83	234.78	66.88	14.74	53.87
20-Dec-10 17:09:00	275.90	12.52	122141.79	236.14	234.78	67.08	14.74	54.14
20-Dec-10 17:10:00	275.55	12.52	121516.23	233.13	234.28	67.22	14.74	53.19
20-Dec-10 17:11:00	275.63	12.49	121779.00	234.63	234.82	67.17	14.74	53.27
20-Dec-10 17:12:00	276.46	12.56	121992.92	236.43	234.65	67.18	14.74	53.61
20-Dec-10 17:13:00	275.55	12.47	122161.59	231.31	234.75	67.21	14.74	53.20
20-Dec-10 17:14:00	275.89	12.60	121947.72	234.95	234.98	67.24	14.74	54.18
20-Dec-10 17:15:00	276.24	12.55	121850.73	235.21	234.67	67.31	14.74	52.91
20-Dec-10 17:16:00	275.90	12.56	122105.78	234.89	235.05	67.08	14.74	53.52
20-Dec-10 17:17:00	276.26	12.62	122085.77	237.02	234.78	66.91	14.74	54.77
20-Dec-10 17:18:00	275.63	12.57	121939.91	233.51	234.62	66.86	14.74	54.34
20-Dec-10 17:19:00	276.11	12.55	121952.45	235.56	235.45	66.81	14.74	54.35
20-Dec-10 17:20:00	276.29	12.58	122011.24	234.94	235.08	66.67	14.74	54.43
20-Dec-10 17:21:00	275.98	12.55	122316.39	235.56	234.95	66.52	14.74	55.29
20-Dec-10 17:22:00	276.61	12.59	122269.84	237.10	235.05	66.46	14.74	56.26
20-Dec-10 17:23:00	276.08	12.55	121613.39	233.34	234.52	66.46	14.74	55.00
20-Dec-10 17:24:00	276.17	12.58	122102.97	235.03	235.05	66.34	14.74	54.62
20-Dec-10 17:25:00	276.82	12.63	122305.63	237.21	234.78	66.06	14.74	55.48
20-Dec-10 17:26:00	276.08	12.50	122406.16	232.12	234.78	66.02	14.74	55.65
20-Dec-10 17:27:00	276.90	12.57	122121.66	235.30	234.78	65.87	14.74	55.80
20-Dec-10 17:28:00	277.48	12.72	122209.81	235.98	235.12	65.72	14.74	55.79
20-Dec-10 17:29:00	277.06	12.48	123020.95	237.16	234.78	65.72	14.74	57.52
Average	274.67	12.41	121382.99	233.48	234.67	68.27	14.74	51.69

APPENDIX C
CALIBRATION GAS CERTIFICATIONS



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: EPA Protocol Gas

Assay Laboratory

P.O. No.: ALAS-55510
AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 05-86523-002
1290 COMBERMERE STREET
TROY, MI 48083

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
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: ALM019345 Certification Date: 05Apr2010 Exp. Date: 04Apr2013
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	8.91 %	+/- 1%	Direct NIST and VSL
OXYGEN	12.1 %	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** 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 2300	01Nov2010	1D002807	23.04 %	CARBON DIOXIDE
NTRM 2350	01Dec2011	K016398	23.20 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
PIR/2000/609015	01Apr2010	NDIR
CAI/110P/V03018	17Mar2010	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON DIOXIDE

Date: 09Apr2010 Response Unit: MV
Z1 = 0.00000 R1 = 100.0000 T1 = 56.20000
R2 = 100.0000 Z2 = 0.00000 T2 = 56.16000
Z3 = 0.00000 T3 = 56.24000 R3 = 100.1500
Avg. Concentration: 8.916 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999989193
Constants: A = -0.00227705
B = 0.142642211 C = -0.0004657
D = 0.0000133988 E = 0

OXYGEN

Date: 09Apr2010 Response Unit: %
Z1 = 0.00000 R1 = 23.20000 T1 = 12.11000
R2 = 23.20000 Z2 = 0.00000 T2 = 12.10000
Z3 = 0.00000 T3 = 12.09000 R3 = 23.19000
Avg. Concentration: 12.08 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999996852
Constants: A = -0.0380151
B = 1.001181055 C = 0
D = 0 E = 0

APPROVED BY: _____



AIR LIQUIDE

Air Liquide America
Specialty Gases LLC



Scott™

RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

P.O. No.: ALAS-56936
AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 05-88735-006
1290 COMBERMERE STREET
TROY, MI 48083

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
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: ALM004185 Certification Date: 21Jun2010 Exp. Date: 20Jun2013
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	19.1 %	+/- 1%	Direct NIST and VSL
OXYGEN	21.1 %	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** 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 2300	01Nov2010	1D002807	23.04 %	CARBON DIOXIDE
NTRM 2350	01Dec2011	K016398	23.20 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
PIR/2000/609015	07Jun2010	NDIR
CAI/110P/V03018	11Jun2010	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

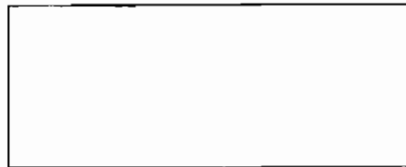
Calibration Curve

CARBON DIOXIDE

Date: 21Jun2010 Response Unit: MV

Z1 = 0.00000	R1 = 100.0000	T1 = 90.42000
R2 = 100.0000	Z2 = 0.00000	T2 = 90.50000
Z3 = 0.00000	T3 = 90.50000	R3 = 100.0000

Avg. Concentration: 19.07 %



Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999986

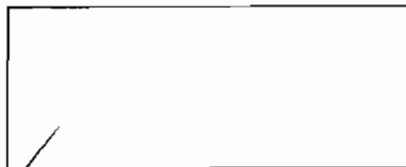
Constants: A = -0.00586731
B = 0.131065552 C = -0.0001375
D = 1.12705E-05 E = 0

OXYGEN

Date: 21Jun2010 Response Unit: %

Z1 = 0.00000	R1 = 23.20000	T1 = 21.15000
R2 = 23.20000	Z2 = 0.00000	T2 = 21.15000
Z3 = 0.00000	T3 = 21.15000	R3 = 23.20000

Avg. Concentration: 21.14 %



Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999999

Constants: A = -0.00484606
B = 0.999830474 C = 0
D = 0 E = 0

Special Notes:

PART# AH095

APPROVED BY:

JEFF CROTEAU



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.: ALASG-55510
Project No.: 05-86916-005

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
TULSA OK 74106

P

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: **AAL13310** Certification Date: **22Apr2010** Exp. Date: **21Apr2012**
Cylinder Pressure***: **2015 PSIG**

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON MONOXIDE	12.1 PPM	+/- 1%	Direct NIST and VSL
NITRIC OXIDE	12.1 PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE	BALANCE		
TOTAL OXIDES OF NITROGEN	12.1 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 2629	02Oct2010	KAL003166	25.21 PPM	CARBON MONOXIDE
	01Jun2010	KAL004325	20.36 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//0928621	02Apr2010	FTIR
ECO PHYSICS/CLD 84M/84M0359	19Apr2010	CHEMI

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE

Date: 14Apr2010 Response Unit: PPM
Z1 = -0.05307 R1 = 25.30663 T1 = 12.10338
R2 = 25.31267 Z2 = -0.05306 T2 = 12.12388
Z3 = -0.03830 T3 = 12.14423 R3 = 25.34334
Avg. Concentration: 12.09 PPM

Second Triad Analysis

Date: 21Apr2010 Response Unit: PPM
Z1 = -0.06291 R1 = 25.26965 T1 = 12.17129
R2 = 25.30621 Z2 = -0.02751 T2 = 12.19690
Z3 = 0.02191 T3 = 12.19939 R3 = 25.34779
Avg. Concentration: 12.15 PPM

Calibration Curve

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 9.99986E-1
Constants: A = 0.00000E+0
B = 8.81389E-1 C = 5.84000E-4
D = 1.00000E-6 E = 0.00000E+0

NITRIC OXIDE

Date: 14Apr2010 Response Unit: MV
Z1 = 0.00000 R1 = 20.33000 T1 = 12.05000
R2 = 20.35000 Z2 = 0.00000 T2 = 12.05000
Z3 = 0.00000 T3 = 12.05000 R3 = 20.34000
Avg. Concentration: 12.11 PPM

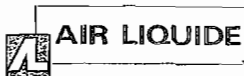
Date: 21Apr2010 Response Unit: MV
Z1 = 0.00000 R1 = 20.29000 T1 = 11.96000
R2 = 20.28000 Z2 = 0.00000 T2 = 11.96000
Z3 = 0.00000 T3 = 11.96000 R3 = 20.29000
Avg. Concentration: 12.04 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999989
Constants: A = 0.052499
B = 0.998591 C = 0.000000
D = 0.000000 E = 0.000000

Special Notes: AH072 Lot Number: 0586916005

APPROVED BY: _____

Rob. McCrandall



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.: ALAS-56465

Project No.: 05-87288-002

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
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: **CC173507**

Certification Date: **07May2010**

Exp. Date: **06May2012**

Cylinder Pressure***: **2015 PSIG**

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON MONOXIDE	23.2 PPM	+/- 1%	Direct NIST and VSL
NITRIC OXIDE	23.4 PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE	BALANCE		
TOTAL OXIDES OF NITROGEN	23.6 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 2636	02Oct2011	KAL003744	240.8 PPM	CARBON MONOXIDE
NTRM 1684 1	15Oct2012	KAL004434	95.84 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//0928621	30Apr2010	FTIR
FTIR//0928621	09Apr2010	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: 30Apr2010 Response Unit:PPM Z1 = -0.00481 R1 = 241.9239 T1 = 23.39141 R2 = 242.0561 Z2 = -0.00195 T2 = 23.42998 Z3 = 0.23106 T3 = 23.44974 R3 = 242.2529 Avg. Concentration: 23.23 PPM	Date: 07May2010 Response Unit: PPM Z1 = -0.00417 R1 = 240.9105 T1 = 23.18030 R2 = 241.2416 Z2 = 0.00845 T2 = 23.21160 Z3 = 0.28117 T3 = 23.35798 R3 = 241.2468 Avg. Concentration: 23.13 PPM	Concentration = A + Bx + Cx2 + Dx3 + Ex4 r = 9.99985E-1 Constants: A = 0.00000E+0 B = 5.06495E-1 C = 1.93000E-4 D = 0.00000E+0 E = 0.00000E+0
NITRIC OXIDE Date: 30Apr2010 Response Unit:PPM Z1 = -0.03952 R1 = 95.90178 T1 = 23.28269 R2 = 95.91071 Z2 = -0.02811 T2 = 23.36449 Z3 = -0.00286 T3 = 23.37331 R3 = 96.05732 Avg. Concentration: 23.33 PPM	Date: 07May2010 Response Unit: PPM Z1 = -0.13287 R1 = 94.53774 T1 = 23.24871 R2 = 95.07222 Z2 = -0.00119 T2 = 23.38911 Z3 = 0.07275 T3 = 23.45024 R3 = 95.38034 Avg. Concentration: 23.53 PPM	Concentration = A + Bx + Cx2 + Dx3 + Ex4 r = 9.99985E-1 Constants: A = 0.00000E+0 B = 9.98166E-1 C = 2.95000E-4 D = 0.00000E+0 E = 0.00000E+0

Special Notes: AH074 Lot Number: 0587288002

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

Customer: AIR HYGIENE
Location: TULSA, OK

Cylinder S/N: CC103445

Shipping Order Number: 33223677
Transfer Number: 33223677
Lot Number: SFS131505
Valve: CGA 350
Cylinder Pressure*: 2000 PSIG

P.O. Number: 9041201
Item Number: SGZCAH001

Assay Date: 30-Apr-2009

Expiration Date: 30-Apr-2012

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

Table with 3 columns: Components, Requested Concentration, Assay Concentration. Rows for Nitrogen and Methane.

Reference Standard(s) Employed For Analysis

Table with 9 columns: Certified Concentration and Uncertainty, Component, Balance, Cyl. No., SRM/PRM/Mix No., Exp. Date, Sample No., Type. Row for Methane.

Analytical Data

Table with columns: Component, Analyzer Information, FIRST TRIAD ANALYSIS - 30-Apr-2009 (Trial 1, 2, 3), Units. Row for Methane.

Analyst: [Signature] Eric Barron

Approved by: [Signature] Thuan Tran



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: CC113394

Customer: AIR HYGIENE
Location: TULSA, OK

Shipping Order Number: 33119767
Transfer Number: 33119767
Lot Number: SFS131210
Valve: CGA 350
Cylinder Pressure*: 2000 PSIG
*Cylinder should not be used when gas pressure is below 150 psig

P.O. Number: 9032901
Item Number: SGZCAH002

Assay Date: 24-Apr-2009

Expiration Date: 24-Apr-2012

Components	Requested Concentration	Assay Concentration
Nitrogen	Balance	Balance
Methane	5 ppm	4.76 ± 0.05 ppm

Reference Standard(s) Employed For Analysis

Certified Concentration and Uncertainty	Component	Balance	Cyl. No.	SRM/PRM/Mix No.	Exp. Date	Sample No.	Type
10.06 ± 0.04 ppm	Methane	Air	CC204838	SFS103876	18-Mar-2010	NI	GMIS

Analytical Data

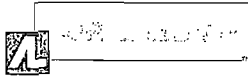
Component:	Methane	FIRST TRIAD ANALYSIS 24-Apr-2009			Units	
		Zero	Trial 1	Trial 2		Trial 3
Analyzer Information	Gas Chromatograph	0.000	0.000	0.000	Area	
Analyzer Type:	Hewlett Packard	Reference	97.22	97.24	97.24	Area
Manufacturer:	G1540A	Candidate	45.95	45.92	46.03	Area
Model Number:	US00003390/Meth	Result	4.755	4.751	4.782	ppm
Serial Number:	23-Apr-2009	Evaluation	Valid	Valid	Valid	
MPR Last Calibrated:	FID & TCD					
Analytical Principle:			Mean Analytical Result: 4.756			ppm

Analyst:

Eric Barron

Approved by:

Jason Unger



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: EPA Protocol Gas

Assay Laboratory

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

P.O. No.: 9081310

Project No.: 05-79607-014

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
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: ALM004952 Certification Date: 08Sep2009 Exp. Date: 07Sep2012
Cylinder Pressure***: 1875 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	8.46 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** 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 2751	01Nov2010	K022940	100.2 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/7506	17Aug2009	TCD/FID

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

METHANE

Date: 08Sep2009	Response Unit: AREA	
Z1=0.00000	R1=900184.0	T1=74841.00
R2=899931.0	Z2=0.00000	T2=74878.00
Z3=0.00000	T3=75055.00	R3=898275.0
Avg. Concentration: 8.460 PPM		



Concentration = A + Bx + Cx ² + Dx ³ + Ex ⁴	
r = 0.999995113	
Constants:	A = 0.11264489
B = 0.000109556	C = 0
D = 0	E = 0

APPROVED BY:

ROBERT LESNIAK



Air Liquide America
Specialty Gases LLC



COMPLIANCE CLASS
Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

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

P.O. No.: ALAS-59094

Project No.: 05-91737-001

Customer

AIR LIQUIDE AMERICA L.P.
AIR HYGIENE
1319 NORTH PEORIA AVE
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: **ALM041691** Certification Date: **28Sep2010** Exp. Date: **29Mar2011**
Cylinder Pressure***: **1950 PSIG**

<u>COMPONENT</u>	<u>CERTIFIED CONCENTRATION (Moles)</u>	<u>ACCURACY**</u>	<u>TRACEABILITY</u>
NITROGEN DIOXIDE	48.2 PPM	+/- 2%	NIST and VSL
NITROGEN	BALANCE		

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

** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

<u>TYPE/SRM NO.</u>	<u>EXPIRATION DATE</u>	<u>CYLINDER NUMBER</u>	<u>CONCENTRATION</u>	<u>COMPONENT</u>
NTRM 2654	02Oct2012	AAL069467	487.0 PPM	NITROGEN DIOXIDE

INSTRUMENTATION

<u>INSTRUMENT/MODEL/SERIAL#</u>	<u>DATE LAST CALIBRATED</u>	<u>ANALYTICAL PRINCIPLE</u>
AMETEK 921/921 CE NO2/AW-921-S281	17Sep2010	UV

Special Notes: PART# AH032 RANGE: 45-50 PPM
LOT # 0591737001

APPROVED BY: HILARY THATCHER

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. NO₂ to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO₂ 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: December 19 and 20, 2010
Company: Florida Power and Light
Location: Loxahatchee, Florida
Techs: JRF/MS

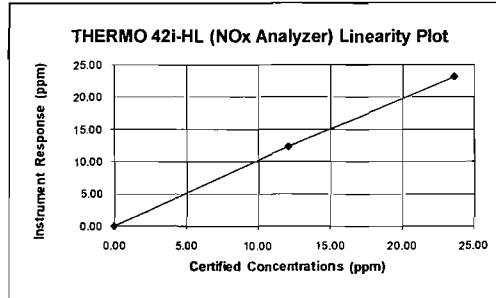
Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
December 19 and 20, 2010	1	0

Calibration Date: December 19, 2010
 Client: Florida Power and Light

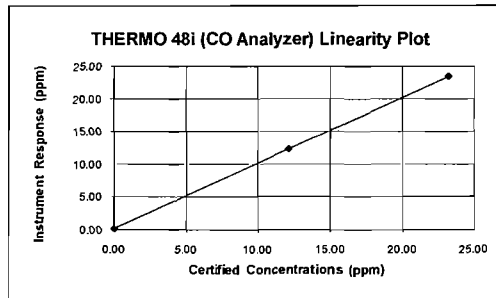
NOx Span (ppm) = 23.60

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.06	0.25	0.06	YES (%)
12.10	12.41	1.31	0.31	YES (%)
23.60	23.20	-1.69	0.40	YES (%)
Linearity = 1.019				



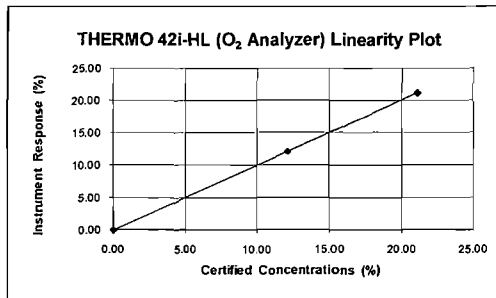
CO Span (ppm) = 23.20

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.17	0.73	0.17	YES (%)
12.10	12.32	0.95	0.22	YES (%)
23.20	23.46	1.12	0.26	YES (%)
Linearity = 0.996				



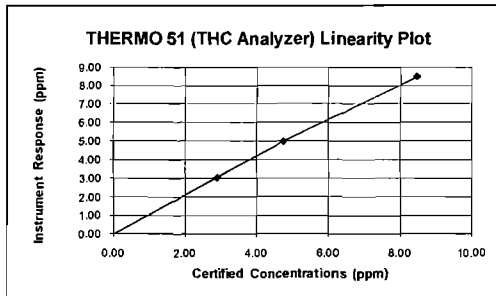
O₂ Span (%) = 21.10

THERMO 42i-HL (O ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.03	0.14	0.03	YES (%)
12.10	12.10	0.00	0.00	YES (%)
21.10	21.18	0.38	0.08	YES (%)
Linearity = 0.998				



THC Range (ppm) = 10.5

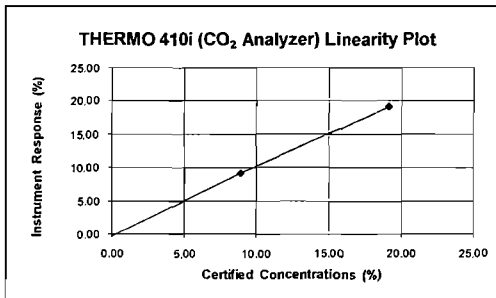
THERMO 51 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2.5%) ¹
0.00	-0.01	-0.10	N/A	YES
2.89	3.03	4.72	2.89	YES
4.76	4.98	4.36	4.77	YES
8.46	8.49	0.29	N/A	YES
Linearity = 1.024				



¹ zero/high based on 2% of span, low/mid based on 5% of concentration

CO₂ Span (%) = 19.10

THERMO 410i (CO ₂ Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	-0.22	-1.15	0.22	YES (%)
8.91	9.26	1.83	0.35	YES (%)
19.10	19.10	0.00	0.00	YES (%)
Linearity = 0.989				



NOx Converter Efficiency

Date: December 19, 2010

Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO₂ to the analyzer and record the NOx concentration displayed. ... Calculate the converter efficiency using Equation 7E-7. The specification for converter efficiency must be met. ... Air Hygiene also references ALT-0013 for specific NO₂ concentration (40-60 ppm) and EPA Traceability Protocol requirements (±2%).

Audit Gas:	NO ₂ Concentration (C _v), ppmvd	48.20
Converter Efficiency Calculations:		
	Analyzer Reading, NO Channel, ppmvd	2.36
	Analyzer Reading, NOx Channel, ppmvd	50.34
	Analyzer Reading, NO ₂ Channel (C _{Dir(NO2)}), ppmvd	47.98
	Converter Efficiency, %	99.54

RM 7E, (08-15-06), 13.5 NO₂ to NO Conversion Efficiency Test (as applicable). The NO₂ to NO conversion efficiency, calculated according to Equation 7E-7 or Equation 7E-9, must be greater than or equal to 90 percent.

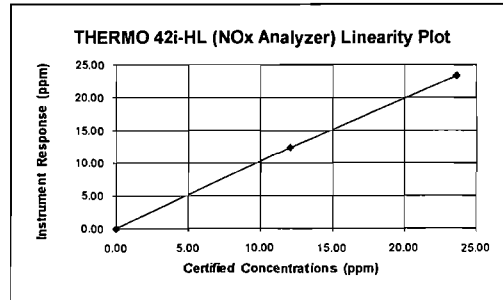
$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V} \right) \times 100 \quad \text{Eq. 7E-7} = \frac{47.98 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 99.54\%$$

Date/Time	Elapsed Time	NOx	NO
mm/dd/yy hh:mm:ss	Seconds	ppmvd	ppmvd
12/19/10 08:09:02	1770	27.06	5.41
12/19/10 08:09:32	1800	46.67	2.72
12/19/10 08:10:02	1830	49.34	2.59
12/19/10 08:10:32	1860	49.75	2.49
12/19/10 08:11:02	1890	49.96	2.42
12/19/10 08:11:32	1920	50.34	2.36
12/19/10 08:12:02	1950	37.61	1.79
12/19/10 08:12:32	1980	5.37	1.30

Calibration Date: December 20, 2010
 Client: Florida Power and Light

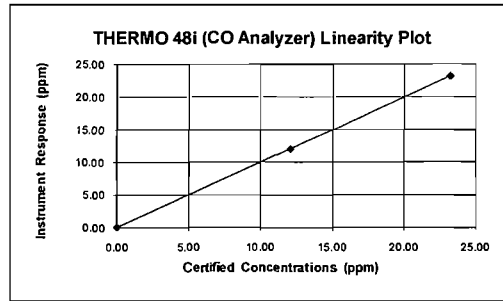
NOx Span (ppm) = 23.60

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.03	0.13	0.03	YES (%)
12.10	12.45	1.48	0.35	YES (%)
23.60	23.32	-1.19	0.28	YES (%)
Linearity = 1.012				



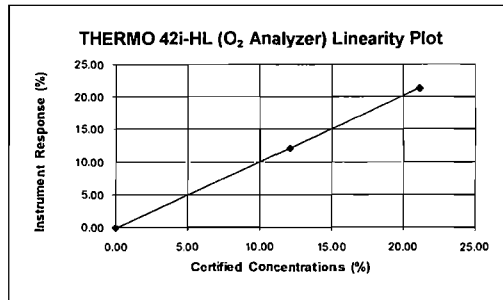
CO Span (ppm) = 23.20

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.11	0.47	0.11	YES (%)
12.10	12.09	-0.04	0.01	YES (%)
23.20	23.18	-0.09	0.02	YES (%)
Linearity = 1.006				



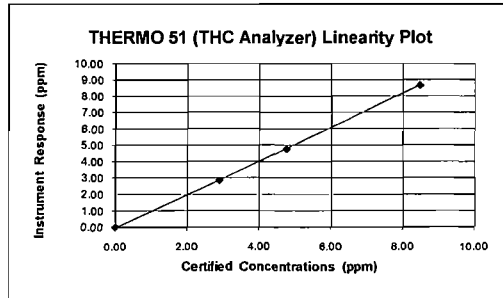
O2 Span (%) = 21.10

THERMO 42i-HL (O2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.03	0.14	0.03	YES (%)
12.10	12.10	0.00	0.00	YES (%)
21.10	21.32	1.04	0.22	YES (%)
Linearity = 0.992				



THC Range (ppm) = 10.5

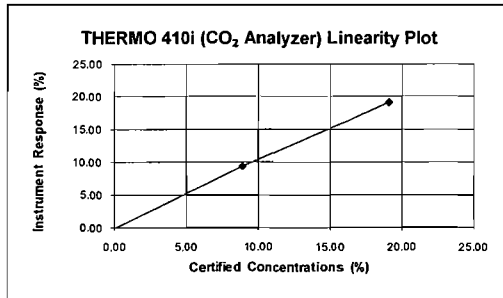
THERMO 51 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2.5%) ¹
0.00	0.00	0.00	N/A	YES
2.89	2.87	-3.17	2.96	YES
4.76	4.79	-1.85	4.88	YES
8.46	8.67	2.00	N/A	YES
Linearity = 0.959				



¹ zero/high based on 2% of span, low/mid based on 5% of concentration

CO2 Span (%) = 19.10

THERMO 410i (CO2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	-0.01	-0.05	0.01	YES (%)
8.91	9.41	2.62	0.50	YES (abs)
19.10	19.09	-0.05	0.01	YES (%)
Linearity = 1.000				



NOx Converter Efficiency

Date: December 20, 2010

Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO₂ to the analyzer and record the NOx concentration displayed. ... Calculate the converter efficiency using Equation 7E-7. The specification for converter efficiency must be met. ... Air Hygiene also references ALT-0013 for specific NO₂ concentration (40-60 ppm) and EPA Traceability Protocol requirements (±2%).

Audit Gas:	NO ₂ Concentration (C _v), ppmvd	48.20
Converter Efficiency Calculations:		
	Analyzer Reading, NO Channel, ppmvd	2.23
	Analyzer Reading, NOx Channel, ppmvd	50.23
	Analyzer Reading, NO ₂ Channel (C _{Dir(NO₂)}), ppmvd	48.00
	Converter Efficiency, %	99.59

RM 7E, (08-15-06), 13.5 NO₂ to NO Conversion Efficiency Test (as applicable). The NO₂ to NO conversion efficiency, calculated according to Equation 7E-7 or Equation 7E-9, must be greater than or equal to 90 percent.

$$Eff_{NO_2} = \left(\frac{C_{Dir}}{C_v} \right) \times 100 \quad \text{Eq. 7E-7} = \frac{48.00 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 99.59\%$$

Date/Time	Elapsed Time	NOx	NO
mm/dd/yy hh:mm:ss	Seconds	ppmvd	ppmvd
12/20/10 08:02:03	1740	12.98	10.87
12/20/10 08:02:33	1770	38.78	3.84
12/20/10 08:03:03	1800	48.32	2.54
12/20/10 08:03:33	1830	49.35	2.44
12/20/10 08:04:03	1860	49.79	2.35
12/20/10 08:04:33	1890	50.03	2.30
12/20/10 08:05:03	1920	50.16	2.25
12/20/10 08:05:33	1950	50.23	2.23
12/20/10 08:06:03	1980	44.02	2.34

DRIFT AND BIAS CHECK						
Fuel Oil Load, Run - 1-1	O ₂	NOx	CO	THC	CO ₂	
Raw Average	13.30	7.56	10.21	0.00	5.34	
Corrected Average	13.40	7.48	10.02	0.07	5.24	
Initial Zero	0.07	0.06	0.17	-0.08	0.15	
Final Zero	0.08	0.06	0.44	-0.08	0.15	
Avg. Zero	0.08	0.06	0.31	-0.08	0.15	
Initial UpScale	12.01	12.15	12.25	3.06	8.94	
Final UpScale	12.01	12.23	12.28	3.11	9.02	
Avg. UpScale	12.01	12.19	12.27	3.09	8.98	
Sys Resp (Zero)	0.03	0.06	0.17	-0.01	-0.22	
Sys Resp (Upscale)	12.10	12.41	12.32	3.03	9.26	
Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91	
Initial Zero Bias	0.19%	0.00%	0.00%	-0.67%	1.94%	
Final Zero Bias	0.24%	0.00%	1.16%	-0.67%	1.94%	
Zero Drift	0.05%	0.00%	1.16%	0.00%	0.00%	
Initial Upscale Bias	-0.43%	-1.10%	-0.30%	0.29%	-1.68%	
Final Upscale Bias	-0.43%	-0.76%	-0.17%	0.76%	-1.26%	
Upscale Drift	0.00%	0.34%	0.13%	0.48%	0.42%	
Alternative Specification Abs Diff	Initial Zero	0.04	0.00	0.00	--	0.37
	Final Zero	0.05	0.00	0.27	--	0.37
	Initial Upscale	0.09	0.26	0.07	--	0.32
	Final Upscale	0.09	0.18	0.04	--	0.24
Calibration Span	21.10	23.60	23.20	10.50	19.10	
3% of Cal. Span (drift)	0.63	0.71	0.70	0.32	0.57	
5% of Cal. Span (bias)	1.06	1.18	1.16	0.53	0.96	

DRIFT AND BIAS CHECK						
Fuel Oil Load, Run - 1-2	O ₂	NOx	CO	THC	CO ₂	
Raw Average	13.49	8.74	10.03	0.28	5.67	
Corrected Average	13.51	8.62	9.99	0.15	5.35	
Initial Zero	0.09	0.15	0.21	0.00	0.22	
Final Zero	0.12	0.18	-0.09	0.31	0.61	
Avg. Zero	0.11	0.17	0.06	0.16	0.42	
Initial UpScale	12.07	12.23	12.18	2.86	8.94	
Final UpScale	12.11	12.16	12.10	3.16	9.39	
Avg. UpScale	12.09	12.20	12.14	3.01	9.17	
Sys Resp (Zero)	0.03	0.03	0.11	0.00	-0.01	
Sys Resp (Upscale)	12.10	12.47	12.09	2.87	9.41	
Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91	
Initial Zero Bias	0.28%	0.51%	0.43%	0.00%	1.20%	
Final Zero Bias	0.43%	0.64%	-0.86%	2.95%	3.25%	
Zero Drift	0.14%	0.13%	1.29%	2.95%	2.04%	
Initial Upscale Bias	-0.14%	-1.02%	0.39%	-0.10%	-2.46%	
Final Upscale Bias	0.05%	-1.31%	0.04%	2.76%	-0.10%	
Upscale Drift	0.19%	0.30%	0.34%	2.86%	2.36%	
Alternative Specification Abs Diff	Initial Zero	0.06	0.12	0.10	--	0.23
	Final Zero	0.09	0.15	0.20	--	0.62
	Initial Upscale	0.03	0.24	0.09	--	0.47
	Final Upscale	0.01	0.31	0.01	--	0.02
Calibration Span	21.10	23.60	23.20	10.50	19.10	
3% of Cal. Span (drift)	0.63	0.71	0.70	0.32	0.57	
5% of Cal. Span (bias)	1.06	1.18	1.16	0.53	0.96	

DRIFT AND BIAS CHECK						
Fuel Oil Load, Run - 1-3	O ₂	NOx	CO	THC	CO ₂	
Raw Average	13.28	10.25	9.41	0.00	6.06	
Corrected Average	13.36	10.10	9.38	0.00	5.40	
Initial Zero	0.12	0.18	-0.09	0.31	0.61	
Final Zero	-0.11	0.16	-0.04	0.01	0.80	
Avg. Zero	0.01	0.17	-0.07	0.16	0.71	
Initial UpScale	12.11	12.16	12.10	3.16	9.39	
Final UpScale	11.94	12.34	12.22	2.96	9.67	
Avg. UpScale	12.03	12.25	12.16	3.06	9.53	
Sys Resp (Zero)	0.03	0.03	0.11	0.00	-0.01	
Sys Resp (Upscale)	12.10	12.47	12.09	2.87	9.41	
Upscale Cal Gas	12.10	12.10	12.10	2.89	8.91	
Initial Zero Bias	0.43%	0.64%	-0.86%	2.95%	3.25%	
Final Zero Bias	-0.66%	0.55%	-0.65%	0.10%	4.24%	
Zero Drift	1.09%	0.08%	0.22%	2.86%	0.99%	
Initial Upscale Bias	0.05%	-1.31%	0.04%	2.76%	-0.10%	
Final Upscale Bias	-0.76%	-0.55%	0.56%	0.86%	1.36%	
Upscale Drift	0.81%	0.76%	0.52%	1.90%	1.47%	
Alternative Specification Abs Diff	Initial Zero	0.09	0.15	0.20	--	0.62
	Final Zero	0.14	0.13	0.15	--	0.81
	Initial Upscale	0.01	0.31	0.01	--	0.02
	Final Upscale	0.16	0.13	0.13	--	0.26
Calibration Span	21.10	23.60	23.20	10.50	19.10	
3% of Cal. Span (drift)	0.63	0.71	0.70	0.32	0.57	
5% of Cal. Span (bias)	1.06	1.18	1.16	0.53	0.96	

DRIFT AND BIAS CHECK			
Strat Test Pre and Post QA/QC Check	O2	CO	NOx
Initial Zero	0.08	0.27	0.10
Final Zero	0.07	0.17	0.06
Avg. Zero	0.08	0.22	0.08
Initial UpScale	12.00	12.30	12.24
Final UpScale	12.01	12.25	12.15
Avg. UpScale	12.01	12.28	12.20
Sys Resp (Zero)	0.03	0.17	0.06
Sys Resp (Upscale)	12.10	12.32	12.41
Upscale Cal Gas	12.10	12.10	12.10
Initial Zero Bias	0.24%	0.43%	0.17%
Final Zero Bias	0.19%	0.00%	0.00%
Zero Drift	0.05%	0.43%	0.17%
Initial Upscale Bias	-0.47%	-0.09%	-0.72%
Final Upscale Bias	-0.43%	-0.30%	-1.10%
Upscale Drift	0.05%	0.22%	0.38%
Alternative Specification Abs Diff	Initial Zero	0.05	0.10
	Final Zero	0.04	0.00
	Initial Upscale	0.10	0.02
	Final Upscale	0.09	0.07
Calibration Span	21.10	23.20	23.60
3% of Range (drift)	0.63	0.70	0.71
5% of Range (bias)	1.06	1.16	1.18
Response Time (min)	1.2	1.7	1.8
Sys. Response (min)	1.8		

INJECTIONS

Date/Time mm/dd/yy hh:mm:ss	O2 %	CO ppm	NOx ppm
12/19/10 08:45:32	20.76	21.00	0.13
12/19/10 08:45:42	20.74	21.35	0.14
12/19/10 08:45:52	20.75	21.68	0.13
12/19/10 08:46:02	20.74	21.49	0.13
12/19/10 08:46:12	20.76	21.09	0.14
12/19/10 08:46:22	19.40	20.73	0.12
12/19/10 08:46:32	6.85	18.88	0.12
12/19/10 08:46:42	0.41	15.20	0.89
12/19/10 08:46:52	0.22	12.67	4.59
12/19/10 08:47:02	0.17	11.59	7.62
12/19/10 08:47:12	0.15	11.80	9.72
12/19/10 08:47:22	0.13	12.15	11.99
12/19/10 08:47:32	0.13	12.22	12.06
12/19/10 08:47:42	0.11	12.14	12.14
12/19/10 08:47:52	0.11	12.29	12.15
12/19/10 08:48:02	0.09	12.27	12.16
12/19/10 08:48:12	0.11	12.44	12.19
12/19/10 08:48:22	0.09	12.35	12.21
12/19/10 08:48:32	0.10	12.33	12.21
12/19/10 08:48:42	0.08	12.24	12.20
12/19/10 08:48:52	0.09	12.20	12.21
12/19/10 08:49:02	0.07	12.29	12.23
12/19/10 08:49:12	0.08	12.33	12.23
12/19/10 08:49:22	0.07	12.28	12.23
12/19/10 08:49:32	0.09	12.31	12.24
12/19/10 08:49:42	4.81	12.28	12.26
12/19/10 08:49:52	11.53	10.35	12.30
12/19/10 08:50:02	11.93	6.78	12.15
12/19/10 08:50:12	11.97	3.70	6.58
12/19/10 08:50:22	11.96	1.58	2.15
12/19/10 08:50:32	11.99	0.70	1.12
12/19/10 08:50:42	11.98	0.35	0.21
12/19/10 08:50:52	12.00	0.22	0.17
12/19/10 08:51:02	11.99	0.23	0.14
12/19/10 08:51:12	12.00	0.23	0.12
12/19/10 08:51:22	12.00	0.20	0.13

METERING SYSTEM DRY GAS METER CALIBRATION SHEET

**EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Asset ID: samp-cp-0009**

Filename: S:\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration 4.1 old[SAMP-CP-0009 Calibration 9-8-10.xls]Original (5 point)
 Make: Thermo Environmental Date: 09/08/10
 Model #: MST-C1 Barometric Pressure: 29.06 (in. Hg)
 Serial #: 90698 Theoretical Critical Vacuum: 13.71 (in. Hg)

DRY GAS METER READINGS						
ΔH (in. H ₂ O)	Time (min)	Volume			Initial Temperature	
		Initial (ft ³)	Final (ft ³)	Total (ft ³)	Inlet (°F)	Outlet (°F)
0.26	17.00	783.190	788.490	5.300	84.0	83.0
0.61	12.00	788.490	794.040	5.550	84.0	83.0
1.10	10.00	794.040	800.070	6.030	86.0	83.0
1.90	10.00	800.070	807.840	7.770	86.0	84.0
3.40	10.00	807.840	818.310	10.470	86.0	84.0

Final Temperature		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature		
Inlet (°F)	Outlet (°F)				Initial (°F)	Final (°F)	Average (°F)
85.0	83.0	40	0.2354	16.0	82.6	82.8	82.7
86.0	83.0	48	0.3491	16.0	82.8	82.9	82.9
86.0	84.0	55	0.4530	16.0	82.9	82.9	82.9
86.0	84.0	63	0.5840	16.0	82.9	82.9	82.9
86.0	84.0	73	0.7945	16.0	82.9	82.9	82.9

RESULTS				
DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (ft ³)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft ³)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft ³)
5.000	141.60	4.992	141.4	5.285
5.238	148.34	5.225	148.0	5.533
5.690	161.14	5.650	160.0	5.984
7.343	207.97	7.284	206.3	7.714
9.933	281.29	9.909	280.6	10.494

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H ₂ O)	Value (mm H ₂ O)	Variation (in. H ₂ O)
0.003	0.998	1.602	40.69	-0.173
0.002	0.998	1.709	43.41	-0.066
-0.003	0.993	1.829	46.46	0.054
-0.004	0.992	1.899	48.24	0.124
0.002	0.998	1.836	46.64	0.061
AVERAGE:	0.996	1.775	45.09	PASSED

Notes:

For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H₂O that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)³*(deg R)^{0.5}/((in.Hg)*(min)).

SIGNATURE: Craig McCarty

DATE: 09/08/10 09/08/10

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID: samp-cp-0009

Filename: S:\Shared\QAQC\Calibrations\PM-Equipment\W-5 Consoles\Calibration 4.1 old\SAMP-CP-0009 Calibration 9-8-10.xls\Original (5 point)

Make: Thermo Environmental
 Model #: MST-C1
 Serial #: 90698

Date: 09/08/10
 Barometric Pressure: 29.06 (in. Hg)
 Temperature (ASTM cal): 83.04 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	99.00	0.50	605.00	0.83	1208.00	0.67
Probe	99.00	0.50	606.00	1.00	1209.00	0.75
Filter	100.00	0.00	606.00	1.00	1209.00	0.75
Dryer	99.00	0.50	605.00	0.83	1208.00	0.67
Aux.	99.00	0.50	605.00	0.83	1208.00	0.67

Note: Calibrated against an ALTEK Thermocouple Source Series 22, direct temperature output calibrated to ASTM and IPTS standards as outlined in ALTEK Data Sheet 22.

Thermocouple	83.04 (°F)	
	Reading	(±°F)
DGM In	84.0	0.96
DGM Out	83.0	0.04

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: Craig McCarty

DATE: 09/08/10 09/08/10

Standard for Calibration of Console Thermocouple Systems

40 CFR, Part 60
 Appendix A, Method 5

10.3.2 The temperature data recorded in the field shall be considered valid. If, during calibration, the absolute temperature measured with the sensor being calibrated and the reference sensor agree within 1.5 percent, the temperature data taken in the field shall be considered valid.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall agree to within ±2°F.

PROBE (STACK), HOTBOX (FILTER), AND GOOSENECK (EXIT) THERMOCOUPLE CALIBRATION SHEET

EPA Reference Method

Metering System Pre-Test Calibration

Air Hygiene Asset ID(s): Probe: samp-hp-0045 Hotbox: samp-bh-0019 Gooseneck: samp-ad-0035

Filename: S:\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration 4.1 old[SAMP-CP-0009 Calibration 9-8-10.xls]Original (5 point)

Barometric Pressure: 29.06

Thermo-couples	Temps (°F)		Signature	Date	
	Ref	±°F			
Stack	Ref	83.70	<i>Craig McCarty</i>	09/08/10	09/08/10
	Read	82.00			
	±°F	1.70			
Filter	Ref	83.70	<i>Craig McCarty</i>	09/08/10	09/08/10
	Read	83.00			
	±°F	0.70			
Exit	Ref	83.70	<i>Craig McCarty</i>	09/08/10	09/08/10
	Read	82.00			
	±°F	1.70			

Note: Calibrated against ASTM Reference Thermometer.

Standard for Calibration of Individual Thermocouples

EMC, ALT-011: After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer (either ASTM reference thermometer or a thermometer that has been calibrated against an ASTM reference thermometer). The temperatures of the thermocouple and reference thermometers shall agree to within ±2°F.

METERING SYSTEM DRY GAS METER CALIBRATION SHEET

EPA Reference Method

Metering System Post-Test Calibration

Air Hygiene Asset ID: samp-cp-0009

Filename: N:\Shared\QAQC\Calibrations\PM-Equipment\M-5 Consoles\Calibration Sheet v4.1\Current[SAMP-CP-0009 Calibration 9-8-10.xls]1-5-11 (3 point)

Make: Thermo Environmental

Date: 01/05/11

Model #: MST-C1

Barometric Pressure: 30.01 (in. Hg)

Serial #: 90698

Theoretical Critical Vacuum: 14.16 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H ₂ O)	Time (min)	Volume			Initial Temperature	
		Initial (ft ³)	Final (ft ³)	Total (ft ³)	Inlet (°F)	Outlet (°F)
1.10	10.00	2.670	8.590	5.920	69.0	61.0
1.10	10.00	8.590	14.510	5.920	68.0	63.0
1.10	10.00	14.510	20.440	5.930	68.0	63.0

Final Temperature		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in. Hg)	Ambient Temperature		
Inlet (°F)	Outlet (°F)				Initial (°F)	Final (°F)	Average (°F)
68.0	63.0	55	0.4530	16.0	64.0	64.4	64.2
68.0	63.0	55	0.4530	16.0	64.6	64.9	64.8
68.0	64.0	55	0.4530	16.0	64.9	65.5	65.2

RESULTS

DRY GAS METER		ORIFICE		
VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL
Vm(std) (ft ³)	Vm(std) (liters)	Vcr(std) (ft ³)	Vcr(std) (liters)	Vcr (ft ³)
5.983	169.43	5.938	168.2	5.880
5.980	169.35	5.935	168.1	5.883
5.987	169.55	5.932	168.0	5.885

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H ₂ O)	Value (mm H ₂ O)	Variation (in. H ₂ O)
0.001	0.992	1.781	45.22	0.001
0.001	0.992	1.779	45.19	0.000
-0.001	0.991	1.779	45.18	-0.001
AVERAGE:	0.992	1.779	45.20	PASSED

LAST 5-PT:	0.996	1.775	PASSED	5-PT Date:
% DIFF:	0.4%	0.2%		09/08/10

40 CFR - CHAPTER I - PART 60

Appendix A, Method 5

10.3.2 Calibration After Use

After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single, intermediate orifice setting (based on the previous field test)...Calculate the average value of the DGM calibration factor. If the value has changed by more than 5 percent, recalibrate the meter over the full range of orifice settings, as detailed in Section 10.3.1.

10.3.3 Acceptable Variation in Calibration
If the DGM coefficient values obtained before and after a test series differ by more than 5 percent, the test series shall either be voided, or calculations for the test series shall be performed using whichever meter coefficient value (i.e., before or after) gives the lower value of total sample volume.

Notes: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H₂O that equates to 0.75 cfm of air at 68 °F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/- 0.2. For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above. The Critical Orifice Coefficient, K', must be entered in English units, (ft)³*(deg R)^{0.5}/((in.Hg)*(min)).

SIGNATURE: _____

DATE: 01/05/11 1/5/11

VISIBLE EMISSIONS EVALUATOR

This is to certify that

SUBRAMANIAM VENKITACHALAM

met the specifications of Federal Reference Method 9 and qualifies as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, NC. This certificate is valid for six months from date of issue.

389958	CERT NUMBER
9/22/2010	DATE OF SCHOOL
OKLAHOMA CITY, OK	SCHOOL LOCATION
3/24/2011	CERTIFICATION EXP DATE
VEN870126	STUDENT ID NUMBER
<i>Jody Monk</i> Director of Training	

EASTERN TECHNICAL ASSOCIATES

JBRAMANIAM VENKITACHALA

VEN870126 STUDENT ID NUMBER

met the specifications of Federal Reference Method 9 and qualifies as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, NC. This certificate is valid for six months from date of issue and expires on the date below.

OKLAHOMA CITY, OK	9/22/2010	389958
SCHOOL LOCATION	DATE OF SCHOOL	CERT NUMBER
TULS10	3/24/2011	
LAST LECTURE	CERTIFICATION EXP DATE	BEARER

Customer Support
Debbie Scalise

debbie@smokeschool.com

Want to know when we will
be in your area? Join our
emailing list at
www.smokeschool.com

919-878-3188

APPENDIX E
FUEL ANALYSIS RECORDS

Client: Florida Power and Light
Location: West County Energy Center
Date: December 19-20, 2010
Project #: bv-09-westcounty.fl-comp#1

Fuel Oil - Fuel Analysis

Characteristics of Fuel Gas	
Molecular Weight of oil =	15.828 lb/lb-mole
Btu per lb. of oil =	19,661.00 gross (HHV)
Btu per lb. of oil =	18,465.00 net (LHV)
Density of fuel oil ² =	54.7368 lb/cu. ft
Density of fuel oil ² =	7.3173 lb/gal
Specific Gravity =	0.8786 @ 68 deg F

Standardized to 68 deg F and 14.696 psia

Component	Wt%
carbon	86.27
oxygen	0.00
hydrogen	13.43
nitrogen	0.30
helium	0.00
sulfur	0.00
Total	100.00

Fuel Oil HHV Conv.	
HHV (Btu/lb)	19,661.00
HHV (Btu/SCF)	1,076,180

Fuel Oil LHV Conv.	
LHV (Btu/lb)	18,465.00
LHV (Btu/SCF)	1,010,715

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 9,201.99 (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 fuel oil based on lab analysis or specific gravity multiplied by density of water at 68 deg F and 14.696 psia.

References:

- ¹ ASTM D 3588
- ² Civil Engineering Reference Manual, 7th ed. - Michael R. Lindeburg
- ³ Mark's Standard Handbook for Mechanical Engineers, 10th ed. - Eugene A. Avallone, Theodore Baumeister III
- ⁴ Introduction to Fluid Mechanics, 3rd ed. - William S. Janna
- ⁵ 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: 1030-2010120485-001A

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

January 10, 2011

Sample ID:
 Station Name: Unit 1B Fuel Oil
 Station Number:
 Location: Tulsa, OK
 Sample Point:

Sampled By:
 Sample Of: Liquid
 Sample Date: 12/19/2010
 Sample Condition:
 PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Heat of Combustion	ASTM-D-240	19661	Gross BTU / lb		KCT	12/29/10
Heat of Combustion	ASTM-D-240	18456	Net BTU/lb		KCT	12/29/10
Heat of Combustion	ASTM-D-240	NR	Gross BTU/Gal		KCT	12/29/10
Heat of Combustion	ASTM-D-240	NR	Net BTU/Gal		KCT	12/29/10
API Gravity @ 60 °F	ASTM-D-5002	35.73	°		KCT	12/27/10
Specific Gravity @ 60/60 °F	ASTM-D-5002	0.8461			KCT	12/27/10
Density @ 60 °F	ASTM-D-5002	0.8453	g/ml		KCT	12/27/10
Sulfur in Liq. Hydrocarbon by UV	ASTM-D-5453	0.0007	wt%	0.0001	EM	01/06/11

Comments: NR = no result

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: 1030-2010120485-001C

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

Sample ID: Unit 1B Fuel Oil
Project Name:
Project Number:
Project Location: Tulsa, OK
Sample Point:

Report Date: 01/05/11
Sample of / Type: Liquid /
Sample Date: 12/19/2010
Sample Conditions: N.G. psi, @ N.G. °F
PO / Ref. No.:

Analytical Data

Test	Method	Results	Unit	Detection Limit	Lab Tech	Date Analyzed
Carbon Content	ASTM D 5291	86.27	wt%		TOT	1/3/2011
Hydrogen Content	ASTM D 5291	13.43	wt%		TOT	1/3/2011
Nitrogen Content	ASTM D 5291	<0.3	wt%		TOT	1/3/2011

The above analyses were performed at a lab other than SPL, Inc., whose name will be disclosed upon request.

Chris Staley
Hydrocarbon Laboratory Manager

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:		JF					
Sample Number	Location	Date	Volume	Analysis Method			
				ASTM-D-240	ASTM-D-5002	ASTM D5453-00	Ultimate Analysis
1	Unit 1B Fuel Oil.	12/19/2010	500mL	X	X	X	X
2	Unit 1B Fuel Oil	12/20/2010	250 mL				
	Sample 2 hold as Backup						
				Also:	LHV		
					Carbon (wt%)		
					Oxygen (wt%)		
	email results to jake@airhygiene.com				Hydrogen (wt%)		
					Nitrogen (wt%)		
					Helium (wt%)		
					Sulfur (wt%)		

Relinquished by: (Signature) [Signature] Date: 12/22/10 Time: 13:00

Received by: (Signature) [Signature] Date: 12/23/10 Time: _____

Relinquished by: (Signature) _____ Date: _____ Time: _____

Received by: (Signature) [Signature] Date: 12/23/10 Time: _____

APPENDIX F
STRATIFICATION TEST DATA

Source Information	
Company	Florida Power and Light
Plant Name	West County Energy Center
Equipment	Mitsubishi 501G
Location	Loxahatchee, Florida

Test Information	
Date	12/19/10
Project #	bv-09-westcounty.fl-comp#1
Unit Number	1B
Load	Base Load
Number of Ports Available	4
Number of Ports Used	4

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"/> Stratification Traverse (Compliance Test) <input type="checkbox"/> RM 20 <input type="radio"/> Stratification Traverse (RATA) <input type="checkbox"/> Part 60 <input type="checkbox"/> Part 75	Circular Stack

METHOD 1 - STRATIFICATION TEST FOR A CIRCULAR SOURCE

Company	Florida Power and Light	Date	12/19/10
Plant Name	West County Energy Center	Project #	bv-09-westcounty.fl-comp#1
Equipment	Mitsubishi 501G	# of Ports Available	4
Location	Loxahatchee, Florida	# of Ports Used	4

Circular Stack or Duct Diameter			
Distance to Far Wall of Stack	(L _{fw})	282.38	in.
Distance to Near Wall of Stack	(L _{nw})	19.00	in.
Diameter of Stack	(D)	263.38	in.
Area of Stack	(A _e)	378.35	ft ²

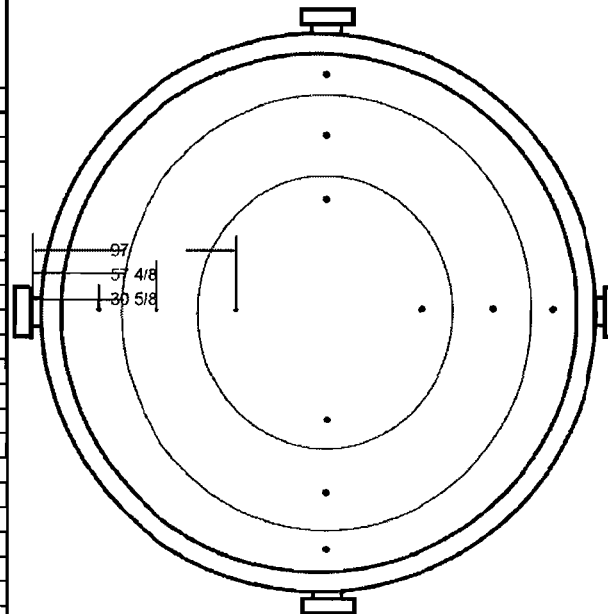
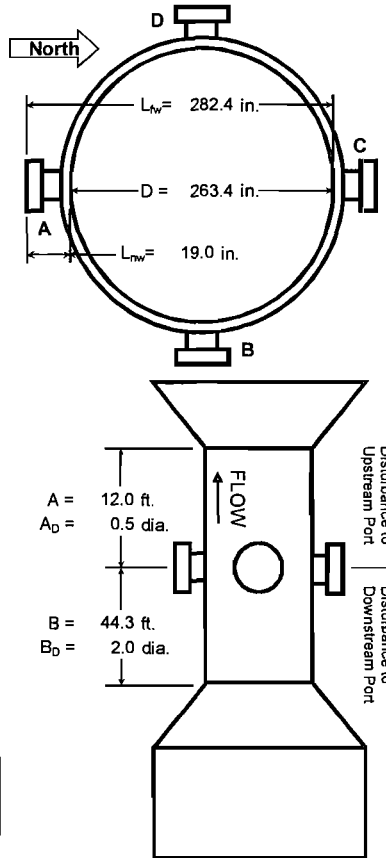
Distance from Disturbances to Port			
Distance Upstream	(A)	144.00	in.
Diameters Upstream	(A _D)	0.55	diameters
Distance Downstream	(B)	531.75	in.
Diameters Downstream	(B _D)	2.02	diameters

Number of Traverse Points Required					
Diameters to Flow Disturbance		Minimum Number of ¹ Traverse Points		Minimum Number of Traverse Points	
Down (B _D) Stream	Up (A _D) Stream	Particulate Points	Velocity Points	Comp Criteria	Stratification 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	Alt 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	12 points	
>= 8.00	>=2.00	8 or 12 ²	8 or 12 ²	Minimum Number of Traverse Points	
Upstream Spec		24	16	RATA Stratification	
Downstream Spec		24	16	RATA Stratification	
Traverse Pts Required		24	16	Criteria	Points
				Part 75/60	12 RM1 pts
				75 abrv (a)	3 points
				75 abrv (b)	6 points

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

Number of Traverse Points Used				
4	Ports by	3	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%	11 5/8	30 5/8
2	14.6%	38 4/8	57 4/8
3	29.6%	78	97
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



STRATIFICATION TRAVERSE (COMPLIANCE TEST) RESULTS

Company	Florida Power and Light		Date	12/19/10
Plant Name	West County Energy Center		Project #	bv-09-westcounty.fl-comp#1
Equipment	Mitsubishi 501G		# of Ports Available	4
Location	Loxahatchee, Florida		# of Ports Used	4

Stack Dimensions				Traverse Data			
Diameter or Length of Stack	(D)	263.38	in.	4	Ports by	3	Pts / port
Width of Stack	(W)		in.	12	Pts Used	12	Required
Area of Stack	(A _s)	378.35	ft ²	Run Start	14:37:00	Run End	15:32:00

Traverse Point	Time Per Point	Point Start Time	Point Stop Time (Reading)	O ₂	Percent Difference	CO	Percent Difference	NO _x	Percent Difference
	min.	hh:mm:ss	hh:mm:ss	%	%	ppm	%	ppm	%
D-3	4.00	14:37:00	14:41:00	13.27	0.16%	9.83	0.67%	8.77	9.36%
D-2	4.00	14:41:00	14:45:00	13.27	0.16%	9.77	0.06%	8.02	0.01%
D-1	4.00	14:45:00	14:49:00	13.27	0.16%	9.98	2.21%	7.72	3.73%
C-3	6.00	14:49:00	14:55:00	13.29	0.01%	10.07	3.13%	8.04	0.26%
C-2	4.00	14:55:00	14:59:00	13.26	0.23%	10.03	2.72%	8.54	6.49%
C-1	4.00	14:59:00	15:03:00	13.33	0.29%	10.21	4.57%	7.90	1.49%
B-3	7.00	15:03:00	15:10:00	13.30	0.07%	10.20	4.46%	8.33	3.88%
B-2	4.00	15:10:00	15:14:00	13.30	0.07%	9.70	0.66%	7.88	1.74%
B-1	4.00	15:14:00	15:18:00	13.28	0.08%	9.53	2.40%	7.76	3.23%
A-3	6.00	15:18:00	15:24:00	13.32	0.22%	9.44	3.32%	7.92	1.24%
A-2	4.00	15:24:00	15:28:00	13.32	0.22%	9.42	3.52%	7.67	4.35%
A-1	4.00	15:28:00	15:32:00	13.28	0.08%	8.99	7.93%	7.68	4.23%
Average				13.29		9.76		8.02	

STRAT TEST DETERMINED SAMPLE POINTS FOR CIRCULAR STACK

Company	Florida Power and Light	Date	12/19/10
Plant Name	West County Energy Center	Project #	bv-09-westcounty.fl-comp#1
Equipment	Mitsubishi 501G	# of Ports Available	4
Location	Loxahatchee, Florida	# of Ports Used	4

Stack Dimensions			Traverse Data			
Diameter or Length of Stack	(D)	263.38 in.	4	Ports by	3	Pts / port
Width of Stack	(W)	in.	12	Pts Used	12	Required
Area of Stack	(A _s)	378.35 ft ²	Run Start	14:37:00	Run End	15:32:00

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
Maximum Percent Difference	9.36 % for NO _x				
Maximum Pollutant Conc. Diff.	0.77 ppm for CO				
Maximum Diluent Conc. Diff.	0.04 % for O ₂				
Stack Diameter	263.38 in.		%	in.	in.
Stratification Conclusions		1	6.0%	15 6/8	34 6/8
Maximum % Diff.	Percent Diff. ≤10% Passed 8.1.2 Three Pt. Criteria	2	17.9%	47 2/8	66 2/8
Maximum Conc. Diff.	Conc. Diff. > 0.5%	3	29.9%	78 6/8	97 6/8
Stack Diameter	D > 93.6 in.				

Passed Strat. Test Under RM 7E 8.1.2 Three Pt. Criteria
Sample from the measurement line exhibiting the highest average concentration

Test Type	<input type="checkbox"/> Moisture, for MW	<input type="checkbox"/>
	<input type="checkbox"/> Moisture, for wet-to-dry	<input type="checkbox"/> 6.5.6(b)(2) alt. points could apply
	<input checked="" type="checkbox"/> Gas	

