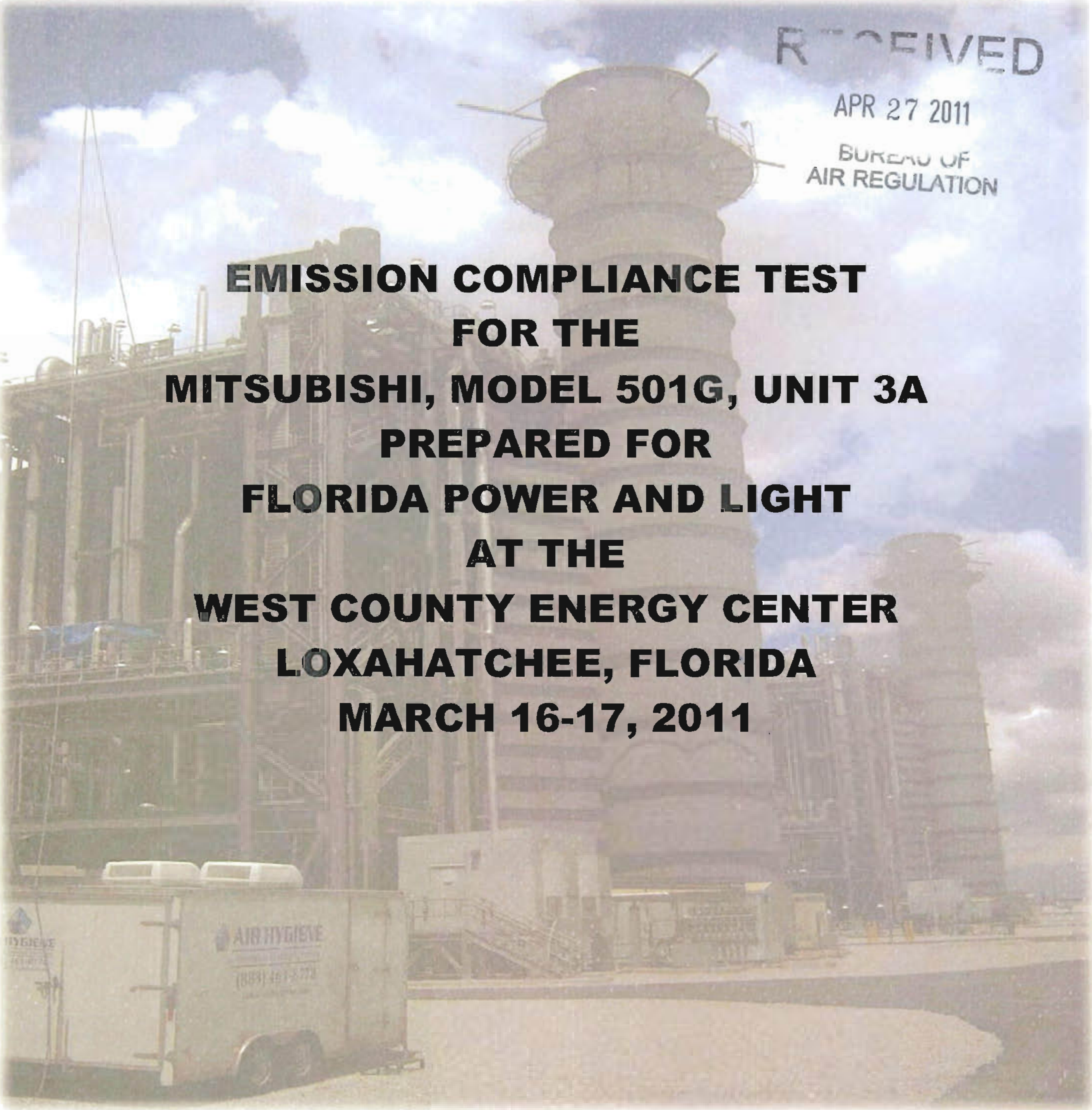
AIR HYGIENE, INC.

Testing Solutions for a Better World



RECEIVED
APR 27 2011
BUREAU OF
AIR REGULATION

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3A
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 16-17, 2011

Corporate Headquarters
5634 S. 122nd E. Ave. Suite F
Tulsa, OK 74146

AIR HYGIENE, INC.
(918) 307-8865 or (888) 461-8778
www.airhygiene.com

Remote Testing Offices
Las Vegas, NV 89156
Ft. Worth, TX 76028
Humble, TX 77338
Shreveport, LA 71115
Miami, FL 33101
Philadelphia, PA 19136

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3A
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 16-17, 2011

Prepared and Reviewed by:

M Sharief

Mars Sharief, QSTI, Director of Specialty Testing

Paul R Little

Paul Little, QSTI, Director of Customer Service

Jake Fahlenkamp, QSTI, Director of Quality Assurance

Table of Contents

APPENDICES

Emissions Compliance Test
Mitsubishi, Model 501G, Unit 3A
Florida Power and Light
West County Energy Center
Loxahatchee, Florida
March 16-17, 2011

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), ammonia (NH_3), opacity, carbon dioxide (CO_2), and oxygen (O_2) from the exhaust of the Mitsubishi, Model 501G, Unit 3A 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 March 16-17, 2011.

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 two test loads (Base Load and Base Load with Duct Burners). 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 NOx, CO, VOC, NH_3, opacity, CO_2, and O_2 from the exhaust of Florida Power and Light's Mitsubishi, Model 501G, Unit 3A at Base Load and Base Load with Duct Burners of total capacity.

1.2 SUMMARY OF TEST PROGRAM

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

1.2.1 Participating Organizations
- Florida Department of Environmental Protection (FDEP)
- Florida Power and Light
- Black and Veatch
- Air Hygiene

1.2.2 Industry
- Electric Utility / Electric Services

1.2.3 Air Permit and Federal Requirements
- Permit Number: PSD-FL-396
- Emission Unit Identification (ID): 013

1.2.4 Plant Location
- West County Energy Center near Loxahatchee, Florida

1.2.5 Equipment Tested
- Mitsubishi, Model 501G, Unit 3A

1.2.6 Emission Points

- Exhaust from the Mitsubishi, Model 501G, Unit 3A
- For all gases, three sample points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3A, determined after conducting a stratification test (refer to Appendix F)
- For all NH_3 testing, 24 sampling points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3A (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 3A

1.2.7 Pollutants Measured

- NOx
- CO
- VOC
- NH_3
- Opacity
- CO_2
- O_2

1.2.8 Dates of Emission Test

- March 16-17, 2011

1.3 KEY PERSONNEL

Florida Power and Light:	John Mirino	305-242-3895
Florida Power and Light:	David Fawcett	561-904-4907
Black and Veatch:	Bill Stevenson	913-458-8549
Air Hygiene:	Jake Fahlenkamp	918-307-8865
Air Hygiene:	Thomas Graham	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Florida Power and Light's Mitsubishi, Model 501G, Unit 3A located at the West County Energy Center on March 16-17, 2011 are summarized in the following table.

TABLE 2.1
SUMMARY OF MITSUBISHI, 501G, UNIT 3A RESULTS

Parameter	Base Load	Permit Limits	Base W/Db Load	Permit Limits
Date (mm/dd/yy)	03/16/11	--	03/17/11	--
Start Time (hh:mm:ss)	9:47:26	--	10:05:07	--
End Time (hh:mm:ss)	13:20:56	--	13:42:37	--
Run Duration (min / run)	60	--	60	--
Bar. Pressure (in. Hg)	30.25	--	30.26	--
Amb. Temp. (°F)	73	--	80	--
Rel. Humidity (%)	54	--	44	--
Spec. Humidity (lb water / lb air)	0.009288	--	0.009193	--
Load Designator	Base	--	Base w/DB	--
NH3 Injection Rate (lb/hr)	237.7	--	258.3	--
Turbine Fuel Flow (lb/min)	1,841	--	1,823	--
Duct Burner Fuel Flow (lb/min)	3	--	158	--
Total Fuel Flow (SCFH)	2,579,919	--	2,771,858	--
Stack Flow (RM19) (SCFH)	59,347,245	--	56,497,516	--
Stack Moisture (% Method 4)	9.3	--	10.1	--
Heat Input (MMBtu/hr)	2,298.6	2,333	2,385.5	2,761
Power Output (megawatts)	249.0	--	247.9	--
NOx (ppmvd)	2.50	--	2.53	--
NOx (ppm@15%O_2)	1.90	2.0	1.75	2.0
NOx (ppm@15%O_2&ISO)	1.92	--	1.74	--
NOx (lb/hr)	17.69	20.0	17.05	20.0
NOx (ton/year) at 8760 hr/year	77.48	--	74.70	--
NOx (lb/MMBtu)	0.007	--	0.006	--
CO (ppmvd)	0.82	--	0.76	--
CO (ppm@15%O_2)	0.62	4.1	0.53	7.6
CO (ppm@15%O_2&ISO)	0.63	--	0.52	--
CO (lb/hr)	3.53	23.2	3.12	52.5
CO (ton/year) at 8760 hr/year	15.47	--	13.65	--
CO (lb/MMBtu)	0.001	--	0.001	--
VOC (ppmvd)	0.54	--	0.60	--
VOC (ppm@15%O_2)	0.41	1.2	0.41	1.5
VOC (ppm@15%O_2&ISO)	0.42	--	0.40	--
VOC (lb/hr)	1.34	4.1	1.40	5.4
VOC (ton/year) at 8760 hr/year	5.86	--	6.12	--
VOC (lb/MMBtu)	0.001	--	0.001	--
Sulfur (gr S/100 scf) (wt% for Fuel Oil)	0.0380	2	0.0380	2
NH_3 (ppmvd)	1.17	--	1.39	--
NH_3 (ppm@15%O_2)	0.89	5	0.96	5
Opacity (%)	0	10	0	10
CO_2 (%)	4.42	--	4.90	--
O_2 (%)	13.13	--	12.40	--

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.

On March 16, 2011 CT 3A tripped during emission compliance testing at 14:37. The cause of the trip was the improper placement of a jumper while checking the fire protection panel for a ground fault. The fault was tracked to an enclosure damper solenoid. Once the source of the ground fault was located and isolated; the CT was restarted and returned to base load at 19:40. Compliance testing was resumed at that time. Additionally, there wasn't enough sample in the fuel sample from March 17, 2011 to do the analysis for sulfur content. The sulfur content results from March 16, 2011 were used for March 17, 2011.

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

Florida Power & 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 3,750 megawatt (MW) greenfield power plant and consists of three combined cycle units (Unit 1, 2 and 3). 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 unit 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 lower heating value (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 carbon monoxide (CO), particulate matter (PM), sulfuric acid mist (H_2SO_4), sulfur dioxide (SO_2) and volatile organic compounds (VOCs). Dry Low-NOx (DLN) combustors for gas firing and water injection for oil firing reduce nitrogen oxides (NOx) emissions. A selective catalyst reduction (SCR) system further reduces NOx emissions.

3.2 SAMPLING LOCATION

The 501G stack is circular and measures 21.9 feet (ft) (263 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 44.3 ft (531 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 NH_3 testing, an initial velocity traverse was performed across the stack at base load from 24 total points. All NH_3 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 3A 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 March 16-17, 2011.

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 6667	Fuel Gas Sample and Laboratory Analysis

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 7e, 9, 10, 19, 25a, and Conditional Test Method (CTM)-027.

Figure 4.1 depicts the sample system used for the NOx, CO, THC, CO_2, and O_2 tests. A stainless steel probe was inserted into the sample ports of the stack to extract gas measurements from the emission stream at three points located at 0.4 (15.7), 1.2 (47.2), and 2.0 (78.7) meters (inches) from the wall of the stack. 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 NOx, CO, CO_2, and O_2 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. NOx 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 (NH_3). 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 3A at each of the multiple test loads for NOx, CO, THC, CO_2, NH_3, opacity, and O_2.

The stack gas analysis for O_2 and CO_2 concentrations was performed in accordance with procedures set forth in EPA Method 3a. The O_2 analyzer uses a paramagnetic cell detector and the CO_2 analyzer uses a continuous nondispersive infrared analyzer.

EPA Method 7e was used to determine concentrations of NOx. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO_2 in nitrogen certified gas cylinder was used to verify at least a 90 percent NO_2 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
NOx	THERMO 42i-HL	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	THERMO 51C-HT	User may select up to 10,000 ppm	0.1 ppm	Flame Ionization Detector.
O_2	THERMO 42i-HL	0-25%	0.1%	Paramagnetic cell, inherently linear.

E:\SHARED\DRAWINGS\EMISSIONS TESTING LAB.PPT 04/18/08 DRAWING:08-001 TKG

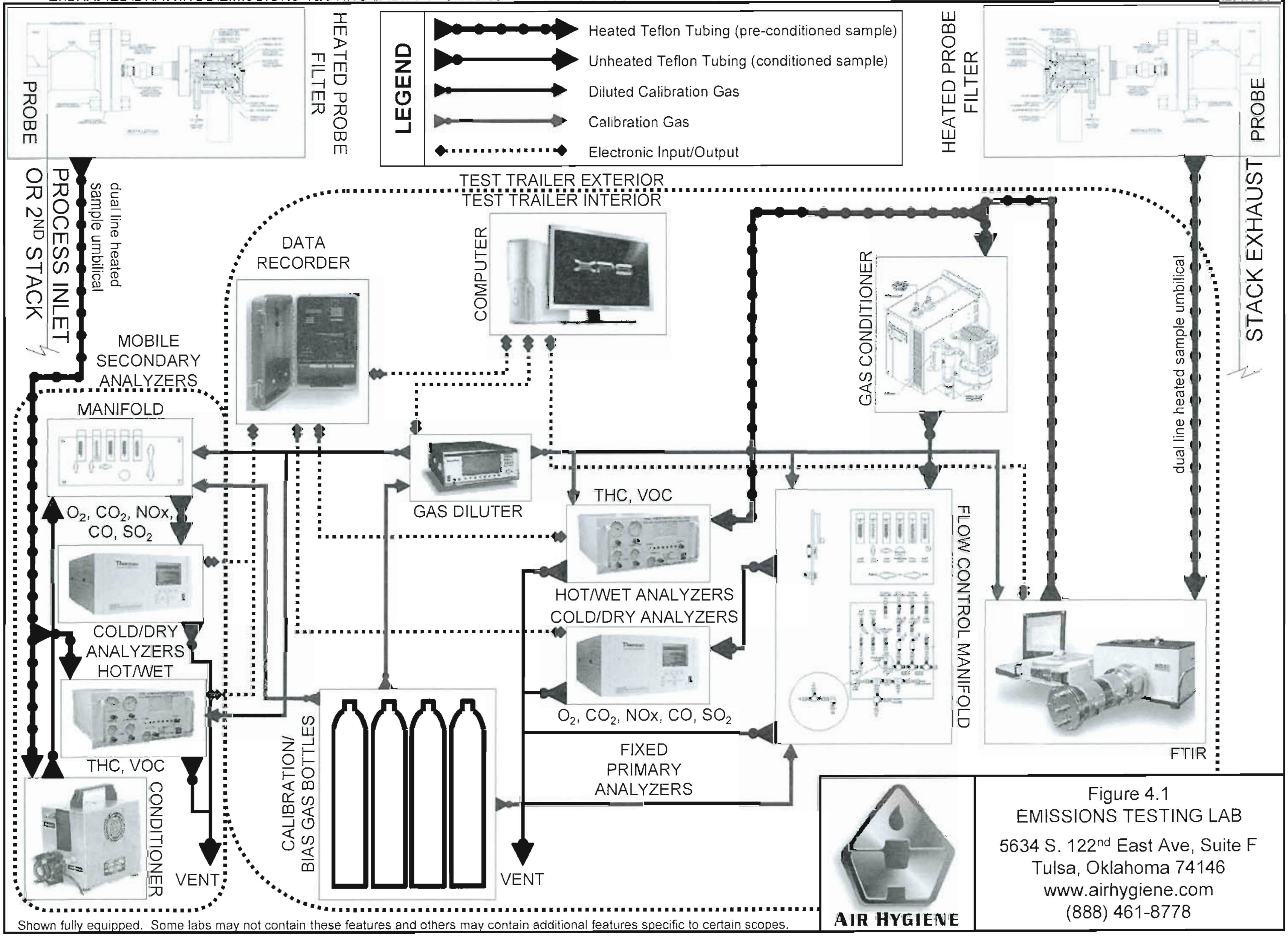


Figure 4.1
EMISSIONS TESTING LAB

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

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

E:\SHARED\DRAWINGS\SAMPLING TRAIN – GEN3.PPT 02/11/04 DRAWING:04-002 TKG

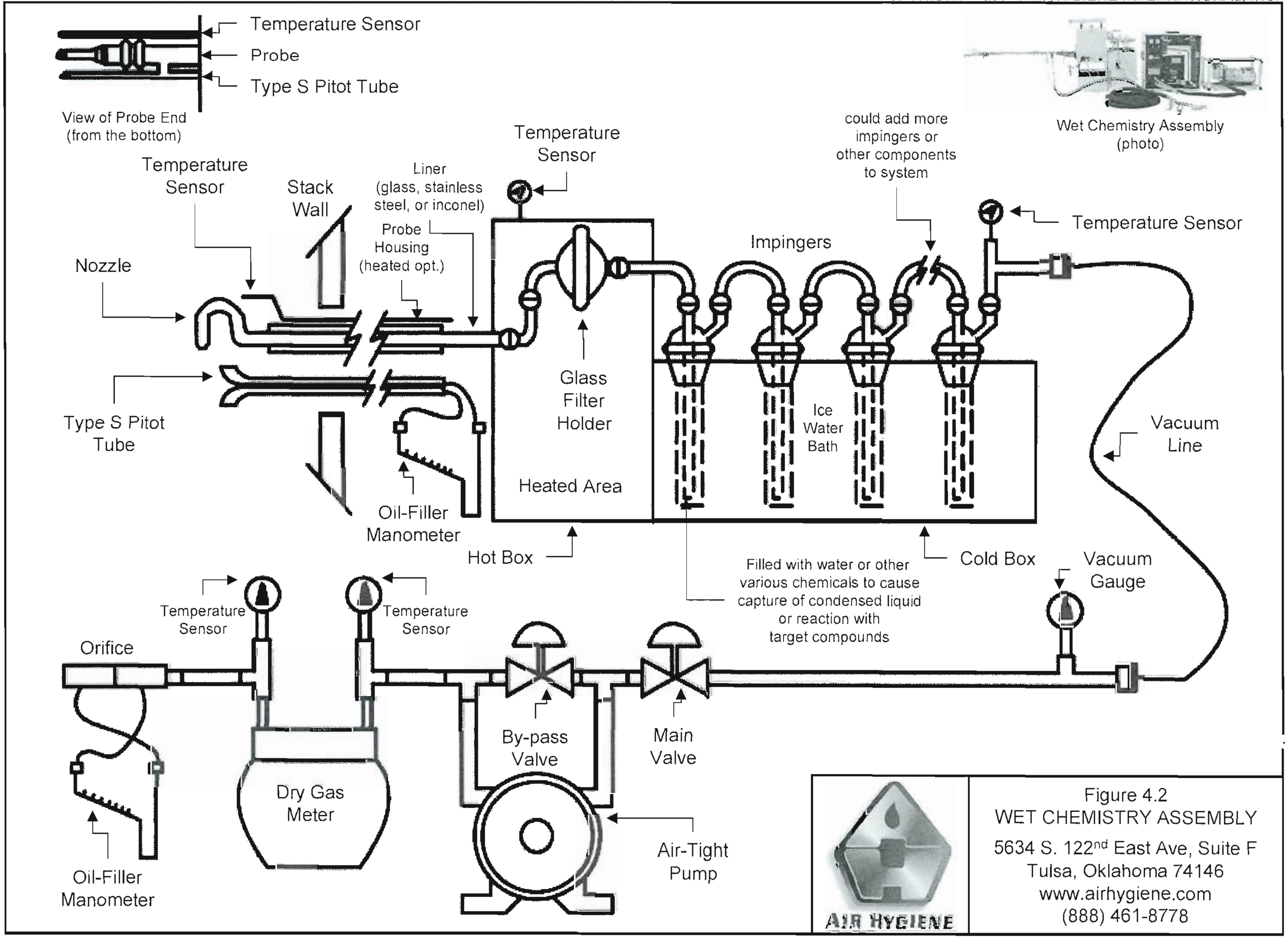


Figure 4.2
WET CHEMISTRY ASSEMBLY

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
3A	Base Load	Stratification Test	1	03/16/11	8:45:56	9:28:26	DAHS
3A	Base	Compliance	1	03/16/11	9:47:26	10:46:56	DAHS
3A	Base	Compliance	2	03/16/11	11:03:26	12:02:56	DAHS
3A	Base	Compliance	3	03/16/11	12:21:26	13:20:56	DAHS
3A	Base W/Db	Compliance	4	03/17/11	10:05:07	11:04:37	DAHS
3A	Base W/Db	Compliance	5	03/17/11	11:25:07	12:24:37	DAHS
3A	Base W/Db	Compliance	6	03/17/11	12:43:07	13:42:37	DAHS
3A	Base	Preliminaries	Base-V1	03/16/11	7:45:00	8:15:00	DAHS
3A	Base	Ammonia	Base-1	03/16/11	9:47:00	11:00:00	DAHS
3A	Base	Ammonia	Base-2	03/16/11	11:12:00	12:26:00	DAHS
3A	Base	Ammonia	Base-3	03/16/11	12:40:00	18:48:00	DAHS
3A	Base wDB	Ammonia	Base wDB-1	03/17/11	10:06:00	11:18:00	DAHS
3A	Base wDB	Ammonia	Base wDB-2	03/17/11	11:30:00	12:42:00	DAHS
3A	Base wDB	Ammonia	Base wDB-3	03/17/11	12:56:00	14:07:00	DAHS
3A	Base	Opacity	1	03/16/11	11:07:00	12:06:00	DAHS
3A	Base	Opacity	2	03/16/11	12:10:00	13:09:00	DAHS
3A	Base	Opacity	3	03/16/11	13:15:00	14:14:00	DAHS
3A	Base wDB	Opacity	1	03/17/11	11:15:00	12:14:00	DAHS
3A	Base wDB	Opacity	2	03/17/11	12:20:00	13:19:00	DAHS
3A	Base wDB	Opacity	3	03/17/11	13:23:00	14:22:00	DAHS

Note: DAHS Time (EST minus 1hr)

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load

TABLE A.2
MITSUBISHI, 501G, UNIT 3A BASE LOAD DATA SUMMARY

Parameter	Base Load, Run - 1-1	Base Load, Run - 1-2	Base Load, Run - 1-3	Average
Date (mm/dd/yy)	03/16/11	03/16/11	03/16/11	03/16/11
Start Time (hh:mm:ss)	9:47:26	11:03:26	12:21:26	9:47:26
End Time (hh:mm:ss)	10:46:56	12:02:56	13:20:56	13:20:56
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.25	30.24	30.25	30.25
Amb. Temp. (°F)	73	69	77	73
Rel. Humidity (%)	55	57	51	54
Spec. Humidity (lb water / lb air)	0.009400	0.008494	0.009971	0.009288
Load Designator	Base	Base	Base	Base
NH3 Injection Rate (lb/hr)	241.2	237.6	234.3	237.7
Turbine Fuel Flow (lb/min)	1,859	1,842	1,823	1,841
Duct Burner Fuel Flow (lb/min)	3	3	2	3
Total Fuel Flow (SCFH)	2,604,564	2,581,108	2,554,085	2,579,919
Stack Flow (RM19) (SCFH)	59,616,706	59,124,314	59,300,715	59,347,245
Stack Moisture (% Method 4)	9.1	9.3	9.4	9.3
Heat Input (MMBtu/hr)	2,320.6	2,299.7	2,275.6	2,298.6
Power Output (megawatts)	252.2	248.8	246.1	249.0
NOx (ppmvd)	2.51	2.46	2.51	2.50
NOx (ppm@15%O_2)	1.90	1.86	1.93	1.90
NOx (ppm@15%O_2&ISO)	1.93	1.88	1.96	1.92
NOx (lb/hr)	17.88	17.39	17.79	17.69
NOx (ton/year) at 8760 hr/year	78.34	76.15	77.94	77.48
NOx (lb/MMBtu)	0.007	0.007	0.007	0.007
CO (ppmvd)	0.88	0.91	0.66	0.82
CO (ppm@15%O_2)	0.67	0.69	0.51	0.62
CO (ppm@15%O_2&ISO)	0.68	0.70	0.52	0.63
CO (lb/hr)	3.82	3.91	2.87	3.53
CO (ton/year) at 8760 hr/year	16.74	17.11	12.55	15.47
CO (lb/MMBtu)	0.001	0.002	0.001	0.001
VOC (ppmvd)	0.56	0.56	0.51	0.54
VOC (ppm@15%O_2)	0.42	0.42	0.39	0.41
VOC (ppm@15%O_2&ISO)	0.43	0.43	0.40	0.42
VOC (lb/hr)	1.39	1.37	1.26	1.34
VOC (ton/year) at 8760 hr/year	6.07	5.99	5.52	5.86
VOC (lb/MMBtu)	0.001	0.001	0.000	0.001
Sulfur (gr S/100 scf)	0.0380	0.0380	0.0380	0.0380
NH_3 (ppmvd)	0.99	1.12	1.41	1.17
NH_3 (ppm@15%O_2)	0.75	0.85	1.08	0.89
Opacity (%)	0	0	0	0
CO_2 (%)	4.43	4.42	4.42	4.42
O_2 (%)	13.09	13.10	13.21	13.13

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,859	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,604,564	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	55
Ambient Temperature	73
Specific Humidity	0.009400

Unit Data

Unit Load	252.2	megawatts
Heat Input	2,321	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	241	lb/hr
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	59,616,706	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/16/11 09:47:26	10980	13.10	2.82	0.46	0.33	4.60
03/16/11 09:47:56	11010	13.10	2.84	0.39	0.31	4.60
03/16/11 09:48:26	11040	13.11	2.83	0.46	0.31	4.59
03/16/11 09:48:56	11070	13.10	2.82	0.46	0.37	4.61
03/16/11 09:49:26	11100	13.11	2.81	0.44	0.32	4.60
03/16/11 09:49:56	11130	13.10	2.80	0.39	0.34	4.60
03/16/11 09:50:26	11160	13.10	2.78	0.43	0.43	4.61
03/16/11 09:50:56	11190	13.11	2.79	0.42	0.44	4.59
03/16/11 09:51:26	11220	13.12	2.77	0.42	0.46	4.59
03/16/11 09:51:56	11250	13.11	2.75	0.40	0.51	4.60
03/16/11 09:52:26	11280	13.10	2.79	0.40	0.50	4.60
03/16/11 09:52:56	11310	13.11	2.83	0.36	0.52	4.61
03/16/11 09:53:26	11340	13.11	2.84	0.43	0.58	4.61
03/16/11 09:53:56	11370	13.12	2.83	0.47	0.55	4.59
03/16/11 09:54:26	11400	13.12	2.82	0.50	0.55	4.61
03/16/11 09:54:56	11430	13.11	2.80	0.48	0.61	4.62
03/16/11 09:55:26	11460	13.11	2.83	0.45	0.60	4.62
03/16/11 09:55:56	11490	13.10	2.85	0.40	0.58	4.64
03/16/11 09:56:26	11520	13.10	2.87	0.46	0.62	4.63
03/16/11 09:56:56	11550	13.11	2.87	0.40	0.60	4.63
03/16/11 09:57:26	11580	13.12	2.87	0.37	0.58	4.64
03/16/11 09:57:56	11610	13.13	2.82	0.39	0.63	4.63
03/16/11 09:58:26	11640	13.14	2.77	0.48	0.58	4.63
03/16/11 09:58:56	11670	13.13	2.76	0.48	0.54	4.64
03/16/11 09:59:26	11700	13.12	2.79	0.47	0.60	4.63
03/16/11 09:59:56	11730	13.12	2.81	0.49	0.58	4.64
03/16/11 10:00:26	11760	13.13	2.88	0.41	0.54	4.65
03/16/11 10:00:56	11790	13.11	2.87	0.41	0.58	4.64
03/16/11 10:01:26	11820	13.11	2.89	0.36	0.60	4.65
03/16/11 10:01:56	11850	13.11	2.92	0.41	0.51	4.66
03/16/11 10:02:26	11880	13.11	2.94	0.48	0.42	4.64
03/16/11 10:02:56	11910	13.12	2.96	0.36	0.49	4.64
03/16/11 10:03:26	11940	13.13	2.93	0.38	0.44	4.63
03/16/11 10:03:56	11970	13.14	2.93	0.42	0.37	4.72
03/16/11 10:04:26	12000	13.14	2.92	0.47	0.45	4.73
03/16/11 10:04:56	12030	13.12	2.87	0.37	0.48	4.63
03/16/11 10:05:26	12060	13.13	2.86	0.39	0.39	4.63

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,859	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,604,564	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	55
Ambient Temperature	73
Specific Humidity	0.009400

Unit Data

Unit Load	252.2	megawatts
Heat Input	2,321	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	241	lb/hr
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	59,616,706	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/16/11 10:05:56	12090	13.14	2.86	0.43	0.45	4.64
03/16/11 10:06:26	12120	13.14	2.85	0.50	0.45	4.64
03/16/11 10:06:56	12150	13.14	2.83	0.38	0.36	4.65
03/16/11 10:07:26	12180	13.14	2.81	0.34	0.28	4.67
03/16/11 10:07:56	12210	13.15	2.50	0.45	0.29	4.65
03/16/11 10:08:26	12240	13.16	2.36	0.49	0.23	4.65
03/16/11 10:08:56	12270	13.16	2.32	0.46	0.23	4.67
03/16/11 10:09:26	12300	13.16	2.35	0.44	0.26	4.66
03/16/11 10:09:56	12330	13.16	2.42	0.42	0.18	4.66
03/16/11 10:10:26	12360	13.16	2.43	0.40	0.22	4.67
03/16/11 10:10:56	12390	13.14	2.39	0.39	0.28	4.67
03/16/11 10:11:26	12420	13.14	2.40	0.39	0.25	4.67
03/16/11 10:11:56	12450	13.14	2.43	0.34	0.28	4.69
03/16/11 10:12:26	12480	13.14	2.45	0.42	0.30	4.69
03/16/11 10:12:56	12510	13.13	2.48	0.33	0.27	4.69
03/16/11 10:13:26	12540	13.14	2.51	0.44	0.34	4.70
03/16/11 10:13:56	12570	13.15	2.49	0.40	0.32	4.69
03/16/11 10:14:26	12600	13.15	2.47	0.36	0.26	4.69
03/16/11 10:14:56	12630	13.15	2.44	0.33	0.35	4.69
03/16/11 10:15:26	12660	13.16	2.45	0.34	0.32	4.69
03/16/11 10:15:56	12690	13.16	2.45	0.30	0.29	4.68
03/16/11 10:16:26	12720	13.15	2.43	0.40	0.39	4.69
03/16/11 10:16:56	12750	13.13	2.44	0.39	0.46	4.69
03/16/11 10:17:26	12780	13.15	2.48	0.28	0.40	4.67
03/16/11 10:17:56	12810	13.16	2.45	0.43	0.44	4.67
03/16/11 10:18:26	12840	13.17	2.44	0.43	0.52	4.67
03/16/11 10:18:56	12870	13.18	2.39	0.46	0.48	4.65
03/16/11 10:19:26	12900	13.17	2.35	0.41	0.46	4.66
03/16/11 10:19:56	12930	13.16	2.35	0.44	0.52	4.65
03/16/11 10:20:26	12960	13.16	2.39	0.41	0.52	4.65
03/16/11 10:20:56	12990	13.15	2.43	0.48	0.49	4.67
03/16/11 10:21:26	13020	13.15	2.47	0.31	0.57	4.66
03/16/11 10:21:56	13050	13.18	2.49	0.31	0.59	4.65
03/16/11 10:22:26	13080	13.21	2.44	0.41	0.57	4.65
03/16/11 10:22:56	13110	13.20	2.39	0.47	0.61	4.64
03/16/11 10:23:26	13140	13.17	2.41	0.38	0.58	4.65
03/16/11 10:23:56	13170	13.15	2.52	0.30	0.60	4.68

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,859	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,604,564	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	55
Ambient Temperature	73
Specific Humidity	0.009400

Unit Data

Unit Load	252.2	megawatts
Heat Input	2,321	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	241	lb/hr
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	59,616,706	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/16/11 10:24:26	13200	13.16	2.63	0.25	0.64	4.67
03/16/11 10:24:56	13230	13.17	2.65	0.22	0.57	4.66
03/16/11 10:25:26	13260	13.19	2.56	0.23	0.53	4.66
03/16/11 10:25:56	13290	13.19	2.47	0.31	0.61	4.66
03/16/11 10:26:26	13320	13.20	2.44	0.37	0.64	4.67
03/16/11 10:26:56	13350	13.19	2.44	0.36	0.57	4.68
03/16/11 10:27:26	13380	13.18	2.43	0.25	0.61	4.68
03/16/11 10:27:56	13410	13.18	2.44	0.18	0.61	4.69
03/16/11 10:28:26	13440	13.18	2.46	0.29	0.49	4.70
03/16/11 10:28:56	13470	13.18	2.31	0.22	0.55	4.70
03/16/11 10:29:26	13500	13.19	2.25	0.37	0.55	4.69
03/16/11 10:29:56	13530	13.19	2.21	0.30	0.44	4.70
03/16/11 10:30:26	13560	13.20	2.20	0.27	0.46	4.70
03/16/11 10:30:56	13590	13.18	2.18	0.28	0.54	4.70
03/16/11 10:31:26	13620	13.19	2.19	0.26	0.52	4.71
03/16/11 10:31:56	13650	13.19	2.20	0.29	0.54	4.71
03/16/11 10:32:26	13680	13.20	2.20	0.32	0.60	4.69
03/16/11 10:32:56	13710	13.21	2.19	0.33	0.54	4.70
03/16/11 10:33:26	13740	13.21	2.15	0.39	0.54	4.70
03/16/11 10:33:56	13770	13.21	2.14	0.28	0.63	4.69
03/16/11 10:34:26	13800	13.21	2.17	0.25	0.61	4.71
03/16/11 10:34:56	13830	13.19	2.18	0.26	0.57	4.71
03/16/11 10:35:26	13860	13.21	2.22	0.21	0.63	4.70
03/16/11 10:35:56	13890	13.21	2.21	0.17	0.70	4.70
03/16/11 10:36:26	13920	13.23	2.19	0.26	0.68	4.71
03/16/11 10:36:56	13950	13.24	2.17	0.31	0.69	4.69
03/16/11 10:37:26	13980	13.24	2.11	0.37	0.74	4.69
03/16/11 10:37:56	14010	13.24	2.09	0.44	0.70	4.71
03/16/11 10:38:26	14040	13.24	2.13	0.32	0.72	4.71
03/16/11 10:38:56	14070	13.22	2.14	0.27	0.81	4.70
03/16/11 10:39:26	14100	13.22	2.16	0.22	0.76	4.72
03/16/11 10:39:56	14130	13.22	2.17	0.30	0.75	4.72
03/16/11 10:40:26	14160	13.22	2.17	0.26	0.82	4.71
03/16/11 10:40:56	14190	13.21	2.23	0.25	0.73	4.72
03/16/11 10:41:26	14220	13.22	2.25	0.25	0.66	4.72
03/16/11 10:41:56	14250	13.21	2.26	0.21	0.74	4.72
03/16/11 10:42:26	14280	13.21	2.27	0.19	0.76	4.72

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,859	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,604,564	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	55
Ambient Temperature	73
Specific Humidity	0.009400

Unit Data

Unit Load	252.2	megawatts
Heat Input	2,321	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	241	lb/hr
Meas. Stack Moisture	9.1	%
Stack Exhaust Flow (M19)	59,616,706	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/16/11 10:42:56	14310	13.22	2.25	0.24	0.75	4.72
03/16/11 10:43:26	14340	13.23	2.22	0.25	0.79	4.71
03/16/11 10:43:56	14370	13.23	2.18	0.26	0.78	4.70
03/16/11 10:44:26	14400	13.22	2.16	0.17	0.81	4.71
03/16/11 10:44:56	14430	13.19	2.16	0.13	0.84	4.72
03/16/11 10:45:26	14460	13.23	2.22	0.13	0.80	4.70
03/16/11 10:45:56	14490	13.25	2.20	0.35	0.85	4.70
03/16/11 10:46:26	14520	13.25	2.16	0.30	0.84	4.71
03/16/11 10:46:56	14550	13.24	2.12	0.30	0.81	4.70
RAW AVERAGE		**13.16**	**2.50**	**0.36**	**0.53**	**4.67**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	0.02	0.10	-0.53	0.02	0.29
	Final Zero	0.16	0.13	-0.65	-0.03	0.47
	Avg. Zero	0.09	0.12	-0.59	-0.01	0.38
	Initial UpScale	12.11	4.84	4.77	2.93	8.92
	Final UpScale	12.23	4.76	4.56	3.09	9.07
	Avg. UpScale	12.17	4.80	4.67	3.01	9.00
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	13.09	2.51	0.88	0.56	4.43
Concentration (ppm@ 15%O_2)	N/A	1.90	0.67	0.42	N/A
***Concentration* (ppm@ 15%O_2 &ISO)**	N/A	1.93	0.68	0.43	N/A
Emission Rate (lb/hr)	N/A	17.88	3.82	1.39	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	78.34	16.74	6.07	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.001	N/A

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,842	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,581,108	SCFH

Weather Data

Barometric Pressure	30.24
Relative Humidity	57
Ambient Temperature	69
Specific Humidity	0.008494

Unit Data

Unit Load	248.8	megawatts
Heat Input	2,300	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	238	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,124,314	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/16/11 11:03:26	15540	13.24	2.18	0.92	0.67	4.77
03/16/11 11:03:56	15570	13.24	2.13	1.05	0.69	4.76
03/16/11 11:04:26	15600	13.24	2.12	0.96	0.60	4.77
03/16/11 11:04:56	15630	13.24	2.14	1.01	0.61	4.79
03/16/11 11:05:26	15660	13.24	2.17	0.96	0.59	4.78
03/16/11 11:05:56	15690	13.24	2.17	0.89	0.54	4.78
03/16/11 11:06:26	15720	13.24	2.17	1.01	0.58	4.79
03/16/11 11:06:56	15750	13.23	2.20	0.99	0.55	4.79
03/16/11 11:07:26	15780	13.23	2.23	0.91	0.49	4.78
03/16/11 11:07:56	15810	13.24	2.23	0.92	0.53	4.79
03/16/11 11:08:26	15840	13.24	2.22	0.90	0.47	4.78
03/16/11 11:08:56	15870	13.24	2.21	0.92	0.43	4.76
03/16/11 11:09:26	15900	13.24	2.18	0.89	0.48	4.77
03/16/11 11:09:56	15930	13.23	2.17	0.99	0.45	4.79
03/16/11 11:10:26	15960	13.24	2.20	0.96	0.43	4.78
03/16/11 11:10:56	15990	13.24	2.19	0.91	0.53	4.80
03/16/11 11:11:26	16020	13.23	2.22	0.97	0.49	4.81
03/16/11 11:11:56	16050	13.23	2.23	0.91	0.43	4.81
03/16/11 11:12:26	16080	13.24	2.24	0.81	0.51	4.80
03/16/11 11:12:56	16110	13.27	2.21	0.99	0.59	4.81
03/16/11 11:13:26	16140	13.28	2.15	1.04	0.52	4.80
03/16/11 11:13:56	16170	13.26	2.11	1.09	0.46	4.79
03/16/11 11:14:26	16200	13.24	2.13	1.02	0.51	4.82
03/16/11 11:14:56	16230	13.22	2.20	0.92	0.49	4.83
03/16/11 11:15:26	16260	13.24	2.24	0.83	0.45	4.80
03/16/11 11:15:56	16290	13.26	2.24	0.94	0.47	4.80
03/16/11 11:16:26	16320	13.27	2.18	1.01	0.50	4.80
03/16/11 11:16:56	16350	13.26	2.13	1.01	0.44	4.79
03/16/11 11:17:26	16380	13.25	2.14	1.02	0.45	4.79
03/16/11 11:17:56	16410	13.25	2.19	0.94	0.50	4.80
03/16/11 11:18:26	16440	13.25	2.22	0.94	0.71	4.80
03/16/11 11:18:56	16470	13.23	2.24	0.92	0.72	4.79
03/16/11 11:19:26	16500	13.23	2.24	0.82	0.76	4.81
03/16/11 11:19:56	16530	13.25	2.27	0.87	0.70	4.80
03/16/11 11:20:26	16560	13.27	2.21	0.99	0.61	4.78
03/16/11 11:20:56	16590	13.26	2.14	1.00	0.62	4.78
03/16/11 11:21:26	16620	13.23	2.12	0.97	0.65	4.80

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,842	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,581,108	SCFH

Weather Data

Barometric Pressure	30.24
Relative Humidity	57
Ambient Temperature	69
Specific Humidity	0.008494

Unit Data

Unit Load	248.8	megawatts
Heat Input	2,300	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	238	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,124,314	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/16/11 11:21:56	16650	13.21	2.17	0.89	0.63	4.80
03/16/11 11:22:26	16680	13.22	2.21	0.87	0.66	4.78
03/16/11 11:22:56	16710	13.23	2.19	0.97	0.64	4.78
03/16/11 11:23:26	16740	13.27	2.17	0.97	0.60	4.77
03/16/11 11:23:56	16770	13.29	2.08	1.17	0.67	4.74
03/16/11 11:24:26	16800	13.29	2.03	1.13	0.69	4.76
03/16/11 11:24:56	16830	13.27	2.04	1.06	0.63	4.77
03/16/11 11:25:26	16860	13.25	2.12	1.06	0.66	4.77
03/16/11 11:25:56	16890	13.24	2.34	0.87	0.67	4.79
03/16/11 11:26:26	16920	13.25	2.53	0.91	0.65	4.81
03/16/11 11:26:56	16950	13.27	2.54	0.88	0.71	4.79
03/16/11 11:27:26	16980	13.28	2.46	0.97	0.72	4.78
03/16/11 11:27:56	17010	13.28	2.40	1.03	0.66	4.79
03/16/11 11:28:26	17040	13.28	2.37	1.05	0.72	4.79
03/16/11 11:28:56	17070	13.27	2.37	1.01	0.70	4.79
03/16/11 11:29:26	17100	13.26	2.41	0.87	0.64	4.80
03/16/11 11:29:56	17130	13.26	2.46	0.86	0.72	4.80
03/16/11 11:30:26	17160	13.28	2.45	0.93	0.73	4.79
03/16/11 11:30:56	17190	13.27	2.44	0.92	0.67	4.79
03/16/11 11:31:26	17220	13.26	2.42	0.90	0.69	4.81
03/16/11 11:31:56	17250	13.26	2.43	0.91	0.71	4.81
03/16/11 11:32:26	17280	13.27	2.46	0.87	0.65	4.81
03/16/11 11:32:56	17310	13.27	2.45	0.88	0.67	4.82
03/16/11 11:33:26	17340	13.26	2.46	0.86	0.68	4.83
03/16/11 11:33:56	17370	13.24	2.47	0.81	0.61	4.83
03/16/11 11:34:26	17400	13.23	2.52	0.79	0.62	4.84
03/16/11 11:34:56	17430	13.24	2.57	0.77	0.66	4.84
03/16/11 11:35:26	17460	13.27	2.51	0.85	0.59	4.82
03/16/11 11:35:56	17490	13.29	2.37	1.04	0.59	4.79
03/16/11 11:36:26	17520	13.30	2.29	1.16	0.60	4.79
03/16/11 11:36:56	17550	13.27	2.25	1.05	0.54	4.80
03/16/11 11:37:26	17580	13.27	2.32	1.00	0.55	4.79
03/16/11 11:37:56	17610	13.27	2.42	0.87	0.61	4.80
03/16/11 11:38:26	17640	13.30	2.45	0.86	0.55	4.80
03/16/11 11:38:56	17670	13.30	2.44	0.95	0.56	4.78
03/16/11 11:39:26	17700	13.30	2.39	0.97	0.59	4.78
03/16/11 11:39:56	17730	13.28	2.37	0.88	0.55	4.80

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,842	lb/min
Duct Burner Fuel Flow	3	*lb/min*
Total Fuel Flow	2,581,108	SCFH

Weather Data

Barometric Pressure	30.24
Relative Humidity	57
Ambient Temperature	69
Specific Humidity	0.008494

Unit Data

Unit Load	248.8	megawatts
Heat Input	2,300	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	238	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,124,314	SCFH

Data from: Run 2 NH3

Base 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 (%)**
03/16/11 11:40:26	17760	13.27	2.44	0.77	0.60	4.82
03/16/11 11:40:56	17790	13.27	2.53	0.79	0.62	4.82
03/16/11 11:41:26	17820	13.28	2.56	0.74	0.58	4.82
03/16/11 11:41:56	17850	13.28	2.52	0.83	0.64	4.83
03/16/11 11:42:26	17880	13.30	2.46	0.83	0.70	4.82
03/16/11 11:42:56	17910	13.32	2.39	0.91	0.64	4.81
03/16/11 11:43:26	17940	13.31	2.31	1.05	0.67	4.82
03/16/11 11:43:56	17970	13.29	2.29	0.98	0.74	4.84
03/16/11 11:44:26	18000	13.28	2.37	0.82	0.66	4.84
03/16/11 11:44:56	18030	13.27	2.46	0.86	0.62	4.86
03/16/11 11:45:26	18060	13.28	2.47	0.80	0.68	4.86
03/16/11 11:45:56	18090	13.27	2.48	0.78	0.71	4.86
03/16/11 11:46:26	18120	13.28	2.49	0.81	0.64	4.85
03/16/11 11:46:56	18150	13.28	2.70	0.72	0.68	4.86
03/16/11 11:47:26	18180	13.29	2.86	0.78	0.79	4.86
03/16/11 11:47:56	18210	13.29	2.85	0.86	0.78	4.84
03/16/11 11:48:26	18240	13.29	2.80	0.91	0.73	4.84
03/16/11 11:48:56	18270	13.29	2.81	0.84	0.82	4.85
03/16/11 11:49:26	18300	13.30	2.83	0.84	0.89	4.85
03/16/11 11:49:56	18330	13.29	2.82	0.80	0.80	4.84
03/16/11 11:50:26	18360	13.30	2.83	0.76	0.79	4.85
03/16/11 11:50:56	18390	13.31	2.84	0.83	0.82	4.86
03/16/11 11:51:26	18420	13.32	2.81	0.77	0.73	4.85
03/16/11 11:51:56	18450	13.31	2.74	0.84	0.75	4.85
03/16/11 11:52:26	18480	13.32	2.75	0.75	0.83	4.86
03/16/11 11:52:56	18510	13.31	2.77	0.83	0.75	4.87
03/16/11 11:53:26	18540	13.31	2.78	0.82	0.71	4.87
03/16/11 11:53:56	18570	13.30	2.77	0.85	0.79	4.88
03/16/11 11:54:26	18600	13.30	2.82	0.83	0.74	4.89
03/16/11 11:54:56	18630	13.30	2.81	0.76	0.70	4.90
03/16/11 11:55:26	18660	13.30	2.79	0.83	0.78	4.89
03/16/11 11:55:56	18690	13.30	2.79	0.84	0.74	4.90
03/16/11 11:56:26	18720	13.31	2.79	0.79	0.67	4.90
03/16/11 11:56:56	18750	13.28	2.80	0.86	0.75	4.89
03/16/11 11:57:26	18780	13.29	2.80	0.87	0.73	4.88
03/16/11 11:57:56	18810	13.31	2.86	0.77	0.67	4.89
03/16/11 11:58:26	18840	13.32	2.84	0.81	0.76	4.88

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,842	lb/min
Duct Burner Fuel Flow	3	lb/min
Total Fuel Flow	2,581,108	SCFH

Weather Data

Barometric Pressure	30.24
Relative Humidity	57
Ambient Temperature	69
Specific Humidity	0.008494

Unit Data

Unit Load	248.8	megawatts
Heat Input	2,300	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	238	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,124,314	SCFH

Data from: Run 2 NH3

Base 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 (%)**
03/16/11 11:58:56	18870	13.33	2.77	0.85	0.75	4.87
03/16/11 11:59:26	18900	13.33	2.72	0.80	0.68	4.85
03/16/11 11:59:56	18930	13.32	2.73	0.79	0.71	4.87
03/16/11 12:00:26	18960	13.29	2.77	0.72	0.77	4.90
03/16/11 12:00:56	18990	13.27	2.85	0.69	0.73	4.90
03/16/11 12:01:26	19020	13.28	2.88	0.65	0.70	4.89
03/16/11 12:01:56	19050	13.30	2.82	0.63	0.79	4.89
03/16/11 12:02:26	19080	13.31	2.78	0.81	0.72	4.89
03/16/11 12:02:56	19110	13.30	2.76	0.80	0.68	4.88
RAW AVERAGE		**13.27**	**2.44**	**0.89**	**0.64**	**4.82**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
Bias	**Initial Zero**	0.16	0.13	0.07	-0.03	0.47
	Final Zero	0.31	0.16	-0.28	0.24	0.64
	Avg. Zero	0.24	0.15	-0.11	0.11	0.56
	Initial UpScale	12.23	4.76	4.99	3.09	9.07
	Final UpScale	12.32	4.71	5.55	3.39	9.23
	Avg. UpScale	12.28	4.74	5.27	3.24	9.15
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.10	2.46	0.91	0.56	4.42
Concentration (ppm@ 15%O_2)	N/A	1.86	0.69	0.42	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.88	0.70	0.43	N/A
Emission Rate (lb/hr)	N/A	17.39	3.91	1.37	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	76.15	17.11	5.99	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.002	0.001	N/A

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,823	lb/min
Duct Burner Fuel Flow	2	lb/min
Total Fuel Flow	2,554,085	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	51
Ambient Temperature	77
Specific Humidity	0.009971

Unit Data

Unit Load	246.1	megawatts
Heat Input	2,276	MMBtu/hr
Combustor Inlet Pressure	268	psig
NH_3 Injection Rate	234	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,300,715	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/16/11 12:21:26	20220	13.33	2.88	0.41	0.62	4.86
03/16/11 12:21:56	20250	13.34	2.90	0.57	0.59	4.87
03/16/11 12:22:26	20280	13.36	2.87	0.53	0.50	4.88
03/16/11 12:22:56	20310	13.37	2.79	0.63	0.45	4.87
03/16/11 12:23:26	20340	13.37	2.76	0.64	0.53	4.88
03/16/11 12:23:56	20370	13.36	2.69	0.62	0.54	4.89
03/16/11 12:24:26	20400	13.36	2.74	0.46	0.48	4.90
03/16/11 12:24:56	20430	13.34	2.79	0.54	0.51	4.90
03/16/11 12:25:26	20460	13.34	2.85	0.47	0.53	4.90
03/16/11 12:25:56	20490	13.36	2.89	0.44	0.47	4.91
03/16/11 12:26:26	20520	13.38	2.88	0.57	0.53	4.90
03/16/11 12:26:56	20550	13.36	2.81	0.59	0.72	4.91
03/16/11 12:27:26	20580	13.37	2.80	0.58	0.72	4.90
03/16/11 12:27:56	20610	13.35	2.83	0.46	0.74	4.91
03/16/11 12:28:26	20640	13.36	2.85	0.66	0.79	4.91
03/16/11 12:28:56	20670	13.37	2.86	0.60	0.70	4.91
03/16/11 12:29:26	20700	13.37	2.83	0.52	0.60	4.90
03/16/11 12:29:56	20730	13.38	2.81	0.39	0.63	4.91
03/16/11 12:30:26	20760	13.41	2.80	0.53	0.60	4.90
03/16/11 12:30:56	20790	13.40	2.68	0.68	0.56	4.90
03/16/11 12:31:26	20820	13.39	2.65	0.61	0.68	4.91
03/16/11 12:31:56	20850	13.37	2.73	0.51	0.65	4.91
03/16/11 12:32:26	20880	13.35	2.87	0.38	0.60	4.93
03/16/11 12:32:56	20910	13.36	2.98	0.44	0.64	4.93
03/16/11 12:33:26	20940	13.39	2.97	0.48	0.69	4.92
03/16/11 12:33:56	20970	13.40	2.87	0.50	0.70	4.90
03/16/11 12:34:26	21000	13.40	2.71	0.63	0.79	4.90
03/16/11 12:34:56	21030	13.38	2.65	0.69	0.76	4.92
03/16/11 12:35:26	21060	13.36	2.75	0.47	0.66	4.94
03/16/11 12:35:56	21090	13.37	2.89	0.34	0.71	4.93
03/16/11 12:36:26	21120	13.38	2.94	0.38	0.68	4.92
03/16/11 12:36:56	21150	13.37	2.89	0.48	0.62	4.93
03/16/11 12:37:26	21180	13.39	2.83	0.54	0.67	4.93
03/16/11 12:37:56	21210	13.41	2.78	0.55	0.68	4.92
03/16/11 12:38:26	21240	13.40	2.70	0.64	0.59	4.91
03/16/11 12:38:56	21270	13.38	2.70	0.50	0.59	4.93
03/16/11 12:39:26	21300	13.37	2.84	0.44	0.71	4.94

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,823	lb/min
Duct Burner Fuel Flow	2	lb/min
Total Fuel Flow	2,554,085	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	51
Ambient Temperature	77
Specific Humidity	0.009971

Unit Data

Unit Load	246.1	megawatts
Heat Input	2,276	MMBtu/hr
Combustor Inlet Pressure	268	psig
NH_3 Injection Rate	234	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,300,715	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/16/11 12:39:56	21330	13.37	2.93	0.39	0.69	4.95
03/16/11 12:40:26	21360	13.38	2.95	0.47	0.71	4.93
03/16/11 12:40:56	21390	13.38	2.90	0.47	0.76	4.92
03/16/11 12:41:26	21420	13.39	2.86	0.44	0.66	4.92
03/16/11 12:41:56	21450	13.39	2.85	0.56	0.60	4.92
03/16/11 12:42:26	21480	13.36	2.77	0.45	0.65	4.94
03/16/11 12:42:56	21510	13.41	2.78	0.40	0.64	4.90
03/16/11 12:43:26	21540	13.41	2.70	0.54	0.61	4.90
03/16/11 12:43:56	21570	13.36	2.67	0.54	0.66	4.92
03/16/11 12:44:26	21600	13.40	2.80	0.53	0.64	4.93
03/16/11 12:44:56	21630	13.40	2.83	0.41	0.65	4.93
03/16/11 12:45:26	21660	13.39	2.54	0.47	0.76	4.92
03/16/11 12:45:56	21690	13.38	2.45	0.44	0.81	4.94
03/16/11 12:46:26	21720	13.39	2.49	0.44	0.72	4.94
03/16/11 12:46:56	21750	13.34	2.46	0.31	0.62	4.97
03/16/11 12:47:26	21780	13.31	2.53	0.33	0.66	4.99
03/16/11 12:47:56	21810	13.34	2.56	0.34	0.70	4.97
03/16/11 12:48:26	21840	13.41	2.40	0.48	0.68	4.94
03/16/11 12:48:56	21870	13.49	2.22	0.86	0.69	4.90
03/16/11 12:49:26	21900	13.48	2.03	1.10	0.73	4.90
03/16/11 12:49:56	21930	13.45	2.04	0.93	0.65	4.90
03/16/11 12:50:26	21960	13.45	2.07	0.92	0.63	4.91
03/16/11 12:50:56	21990	13.45	2.13	0.61	0.69	4.92
03/16/11 12:51:26	22020	13.44	2.22	0.71	0.65	4.93
03/16/11 12:51:56	22050	13.42	2.26	0.57	0.59	4.93
03/16/11 12:52:26	22080	13.42	2.30	0.65	0.67	4.92
03/16/11 12:52:56	22110	13.41	2.38	0.64	0.67	4.93
03/16/11 12:53:26	22140	13.40	2.45	0.46	0.58	4.94
03/16/11 12:53:56	22170	13.40	2.49	0.41	0.63	4.94
03/16/11 12:54:26	22200	13.40	2.49	0.48	0.63	4.93
03/16/11 12:54:56	22230	13.40	2.48	0.37	0.57	4.93
03/16/11 12:55:26	22260	13.41	2.42	0.45	0.60	4.93
03/16/11 12:55:56	22290	13.40	2.38	0.45	0.64	4.95
03/16/11 12:56:26	22320	13.39	2.38	0.52	0.58	4.96
03/16/11 12:56:56	22350	13.40	2.44	0.44	0.60	4.94
03/16/11 12:57:26	22380	13.41	2.41	0.42	0.67	4.94
03/16/11 12:57:56	22410	13.41	2.34	0.59	0.60	4.94

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,823	lb/min
Duct Burner Fuel Flow	2	lb/min
Total Fuel Flow	2,554,085	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	51
Ambient Temperature	77
Specific Humidity	0.009971

Unit Data

Unit Load	246.1	megawatts
Heat Input	2,276	MMBtu/hr
Combustor Inlet Pressure	268	psig
NH_3 Injection Rate	234	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,300,715	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/16/11 12:58:26	22440	13.43	2.30	0.49	0.58	4.94
03/16/11 12:58:56	22470	13.44	2.30	0.44	0.62	4.95
03/16/11 12:59:26	22500	13.42	2.27	0.54	0.57	4.96
03/16/11 12:59:56	22530	13.37	2.34	0.36	0.61	4.97
03/16/11 13:00:26	22560	13.32	2.49	0.23	0.74	5.01
03/16/11 13:00:56	22590	13.33	2.59	0.25	0.77	5.01
03/16/11 13:01:26	22620	13.37	2.56	0.35	0.66	4.99
03/16/11 13:01:56	22650	13.40	2.38	0.39	0.61	4.98
03/16/11 13:02:26	22680	13.42	2.25	0.53	0.66	4.95
03/16/11 13:02:56	22710	13.41	2.11	0.58	0.62	4.95
03/16/11 13:03:26	22740	13.36	2.09	0.55	0.56	4.98
03/16/11 13:03:56	22770	13.40	2.23	0.42	0.60	4.98
03/16/11 13:04:26	22800	13.40	2.22	0.45	0.65	4.97
03/16/11 13:04:56	22830	13.45	2.08	0.49	0.59	4.93
03/16/11 13:05:26	22860	13.46	1.99	0.58	0.62	4.93
03/16/11 13:05:56	22890	13.44	2.00	0.60	0.69	4.94
03/16/11 13:06:26	22920	13.43	2.08	0.42	0.64	4.96
03/16/11 13:06:56	22950	13.41	2.14	0.33	0.57	4.96
03/16/11 13:07:26	22980	13.41	2.17	0.35	0.62	4.96
03/16/11 13:07:56	23010	13.40	2.21	0.36	0.62	4.97
03/16/11 13:08:26	23040	13.40	2.21	0.28	0.55	4.98
03/16/11 13:08:56	23070	13.44	2.18	0.25	0.56	4.95
03/16/11 13:09:26	23100	13.47	2.11	0.48	0.60	4.92
03/16/11 13:09:56	23130	13.47	2.00	0.63	0.55	4.93
03/16/11 13:10:26	23160	13.46	2.01	0.51	0.51	4.94
03/16/11 13:10:56	23190	13.43	2.06	0.47	0.58	4.95
03/16/11 13:11:26	23220	13.42	2.15	0.32	0.55	4.95
03/16/11 13:11:56	23250	13.42	2.21	0.26	0.51	4.95
03/16/11 13:12:26	23280	13.42	2.24	0.28	0.57	4.96
03/16/11 13:12:56	23310	13.40	2.23	0.28	0.56	4.98
03/16/11 13:13:26	23340	13.40	2.23	0.25	0.51	4.99
03/16/11 13:13:56	23370	13.43	2.22	0.22	0.58	4.96
03/16/11 13:14:26	23400	13.47	2.16	0.47	0.63	4.95
03/16/11 13:14:56	23430	13.49	2.09	0.47	0.57	4.95
03/16/11 13:15:26	23460	13.48	2.03	0.56	0.54	4.96
03/16/11 13:15:56	23490	13.44	2.04	0.43	0.55	4.97
03/16/11 13:16:26	23520	13.43	2.12	0.33	0.52	4.98

Florida Power and Light
March 16, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,641	SCF exh/MMBtu
Fuel Heating Value (HHV)	989	Btu/SCF fuel
Turbine Fuel Flow	1,823	lb/min
Duct Burner Fuel Flow	2	lb/min
Total Fuel Flow	2,554,085	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	51
Ambient Temperature	77
Specific Humidity	0.009971

Unit Data

Unit Load	246.1	megawatts
Heat Input	2,276	MMBtu/hr
Combustor Inlet Pressure	268	psig
NH_3 Injection Rate	234	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,300,715	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/16/11 13:16:56	23550	13.42	2.19	0.37	0.54	5.00
03/16/11 13:17:26	23580	13.43	2.27	0.30	0.67	5.01
03/16/11 13:17:56	23610	13.44	2.32	0.29	0.66	5.01
03/16/11 13:18:26	23640	13.46	2.24	0.30	0.56	5.01
03/16/11 13:18:56	23670	13.45	2.17	0.41	0.57	4.99
03/16/11 13:19:26	23700	13.44	2.12	0.43	0.67	5.00
03/16/11 13:19:56	23730	13.43	2.15	0.27	0.60	5.01
03/16/11 13:20:26	23760	13.42	2.22	0.22	0.53	5.01
03/16/11 13:20:56	23790	13.42	2.25	0.29	0.53	5.00
RAW AVERAGE		**13.40**	**2.48**	**0.48**	**0.62**	**4.94**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
	Initial Zero	0.31	0.16	-0.28	0.24	0.64
	Final Zero	0.45	0.19	-0.14	0.15	0.75
Bias	**Avg. Zero**	0.38	0.18	-0.21	0.20	0.70
	Initial UpScale	12.32	4.71	4.96	2.98	9.23
	Final UpScale	12.30	4.68	4.71	2.98	9.27
	Avg. UpScale	12.31	4.70	4.84	2.98	9.25
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	13.21	2.51	0.66	0.51	4.42
Concentration (ppm@ 15%O_2)	N/A	1.93	0.51	0.39	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.96	0.52	0.40	N/A
Emission Rate (lb/hr)	N/A	17.79	2.87	1.26	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	77.94	12.55	5.52	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.000	N/A

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load with Duct Burners

TABLE A.3
MITSUBISHI, 501G, UNIT 3A BASE W/DB LOAD DATA SUMMARY

Parameter	Base W/Db Load, Run - 2-1	Base W/Db Load, Run - 2-2	Base W/Db Load, Run - 2-3	Average
Date (mm/dd/yy)	03/17/11	03/17/11	03/17/11	03/17/11
Start Time (hh:mm:ss)	10:05:07	11:25:07	12:43:07	10:05:07
End Time (hh:mm:ss)	11:04:37	12:24:37	13:42:37	13:42:37
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.27	30.27	30.25	30.26
Amb. Temp. (°F)	74	81	84	80
Rel. Humidity (%)	56	42	34	44
Spec. Humidity (lb water / lb air)	0.009899	0.009349	0.008332	0.009193
Load Designator	Base w/DB	Base w/DB	Base w/DB	Base w/DB
NH3 Injection Rate (lb/hr)	265.4	257.0	252.6	258.3
Turbine Fuel Flow (lb/min)	1,841	1,818	1,811	1,823
Duct Burner Fuel Flow (lb/min)	127	173	173	158
Total Fuel Flow (SCFH)	2,753,997	2,785,350	2,776,227	2,771,858
Stack Flow (RM19) (SCFH)	56,657,694	56,567,092	56,267,762	56,497,516
Stack Moisture (% Method 4)	10.1	10.1	9.9	10.1
Heat Input (MMBtu/hr)	2,370.1	2,397.1	2,389.2	2,385.5
Power Output (megawatts)	251.3	247.9	244.4	247.9
NOx (ppmvd)	2.45	2.50	2.63	2.53
NOx (ppm@15%O_2)	1.72	1.73	1.81	1.75
NOx (ppm@15%O_2&ISO)	1.76	1.72	1.75	1.74
NOx (lb/hr)	16.59	16.92	17.65	17.05
NOx (ton/year) at 8760 hr/year	72.67	74.10	77.33	74.70
NOx (lb/MMBtu)	0.006	0.006	0.007	0.006
CO (ppmvd)	0.75	0.73	0.80	0.76
CO (ppm@15%O_2)	0.52	0.51	0.55	0.53
CO (ppm@15%O_2&ISO)	0.53	0.50	0.53	0.52
CO (lb/hr)	3.07	3.02	3.26	3.12
CO (ton/year) at 8760 hr/year	13.46	13.22	14.27	13.65
CO (lb/MMBtu)	0.001	0.001	0.001	0.001
VOC (ppmvd)	0.00	0.90	0.89	0.60
VOC (ppm@15%O_2)	0.00	0.62	0.61	0.41
VOC (ppm@15%O_2&ISO)	0.00	0.62	0.59	0.40
VOC (lb/hr)	0.00	2.12	2.07	1.40
VOC (ton/year) at 8760 hr/year	0.00	9.27	9.08	6.12
VOC (lb/MMBtu)	0.000	0.001	0.001	0.001
Sulfur (gr S/100 scf)	0.0380	0.0380	0.0380	0.0380
NH_3 (ppmvd)	1.44	1.36	1.37	1.39
NH_3 (ppm@15%O_2)	1.00	0.94	0.95	0.96
Opacity (%)	0	0	0	0
CO_2 (%)	4.91	4.90	4.89	4.90
O_2 (%)	12.47	12.36	12.35	12.40

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,841	lb/min
Duct Burner Fuel Flow	127	lb/min
Total Fuel Flow	2,753,997	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	56
Ambient Temperature	74
Specific Humidity	0.009899

Unit Data

Unit Load	251.3	megawatts
Heat Input	2,370	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,657,694	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 10:05:07	12150	12.67	2.64	0.86	0.02	4.79
03/17/11 10:05:37	12180	12.67	2.64	0.77	-0.03	4.80
03/17/11 10:06:07	12210	12.67	2.65	0.90	-0.03	4.80
03/17/11 10:06:37	12240	12.67	2.66	0.79	-0.04	4.82
03/17/11 10:07:07	12270	12.69	2.65	0.79	-0.08	4.80
03/17/11 10:07:37	12300	12.68	2.59	0.82	-0.08	4.80
03/17/11 10:08:07	12330	12.67	2.57	0.83	-0.04	4.81
03/17/11 10:08:37	12360	12.65	2.61	0.76	-0.03	4.82
03/17/11 10:09:07	12390	12.70	2.69	0.84	-0.06	4.83
03/17/11 10:09:37	12420	12.67	2.57	0.92	-0.04	4.82
03/17/11 10:10:07	12450	12.70	2.61	0.89	-0.07	4.84
03/17/11 10:10:37	12480	12.68	2.61	0.83	-0.08	4.85
03/17/11 10:11:07	12510	12.65	2.68	0.86	-0.05	4.88
03/17/11 10:11:37	12540	12.70	2.75	0.73	-0.08	4.86
03/17/11 10:12:07	12570	12.69	2.72	0.87	-0.11	4.84
03/17/11 10:12:37	12600	12.71	2.68	0.87	-0.09	4.84
03/17/11 10:13:07	12630	12.70	2.66	0.81	-0.14	4.83
03/17/11 10:13:37	12660	12.68	2.64	0.81	-0.16	4.84
03/17/11 10:14:07	12690	12.70	2.73	0.69	-0.11	4.84
03/17/11 10:14:37	12720	12.71	2.69	0.81	-0.13	4.82
03/17/11 10:15:07	12750	12.72	2.65	0.89	-0.17	4.83
03/17/11 10:15:37	12780	12.71	2.66	0.91	-0.14	4.82
03/17/11 10:16:07	12810	12.73	2.70	0.90	-0.12	4.83
03/17/11 10:16:37	12840	12.71	2.73	0.85	-0.17	4.83
03/17/11 10:17:07	12870	12.72	2.76	0.84	-0.17	4.82
03/17/11 10:17:37	12900	12.71	2.85	0.82	-0.18	4.83
03/17/11 10:18:07	12930	12.70	2.79	0.75	-0.21	4.82
03/17/11 10:18:37	12960	12.72	2.83	0.79	-0.20	4.83
03/17/11 10:19:07	12990	12.72	2.81	0.72	-0.23	4.82
03/17/11 10:19:37	13020	12.73	2.78	0.82	-0.21	4.81
03/17/11 10:20:07	13050	12.73	2.78	0.74	-0.19	4.83
03/17/11 10:20:37	13080	12.72	2.81	0.81	-0.23	4.81
03/17/11 10:21:07	13110	12.73	2.79	0.73	-0.26	4.82
03/17/11 10:21:37	13140	12.73	2.80	0.79	-0.21	4.82
03/17/11 10:22:07	13170	12.74	2.85	0.79	-0.22	4.80
03/17/11 10:22:37	13200	12.73	2.83	0.77	-0.27	4.83
03/17/11 10:23:07	13230	12.73	2.82	0.72	-0.27	4.81

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,841	lb/min
Duct Burner Fuel Flow	127	lb/min
Total Fuel Flow	2,753,997	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	56
Ambient Temperature	74
Specific Humidity	0.009899

Unit Data

Unit Load	251.3	megawatts
Heat Input	2,370	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,657,694	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 10:23:37	13260	12.74	2.86	0.79	-0.27	4.82
03/17/11 10:24:07	13290	12.74	2.86	0.85	-0.32	4.82
03/17/11 10:24:37	13320	12.74	2.82	0.80	-0.33	4.82
03/17/11 10:25:07	13350	12.76	2.80	0.77	-0.30	4.82
03/17/11 10:25:37	13380	12.74	2.75	0.88	-0.34	4.81
03/17/11 10:26:07	13410	12.74	2.85	0.68	-0.35	4.83
03/17/11 10:26:37	13440	12.69	2.80	0.73	-0.29	4.85
03/17/11 10:27:07	13470	12.63	2.64	0.75	-0.32	4.89
03/17/11 10:27:37	13500	12.66	2.61	0.77	-0.30	4.90
03/17/11 10:28:07	13530	12.68	2.46	0.84	-0.23	4.87
03/17/11 10:28:37	13560	12.68	2.48	0.84	-0.27	4.89
03/17/11 10:29:07	13590	12.67	2.42	0.80	-0.30	4.88
03/17/11 10:29:37	13620	12.65	2.47	0.83	-0.23	4.88
03/17/11 10:30:07	13650	12.67	2.44	0.76	-0.25	4.89
03/17/11 10:30:37	13680	12.67	2.43	0.85	-0.31	4.87
03/17/11 10:31:07	13710	12.67	2.40	0.81	-0.29	4.88
03/17/11 10:31:37	13740	12.66	2.46	0.80	-0.25	4.87
03/17/11 10:32:07	13770	12.66	2.53	0.75	-0.04	4.88
03/17/11 10:32:37	13800	12.67	2.56	0.71	0.06	4.89
03/17/11 10:33:07	13830	12.66	2.57	0.73	-0.03	4.88
03/17/11 10:33:37	13860	12.66	2.55	0.79	-0.07	4.89
03/17/11 10:34:07	13890	12.66	2.50	0.76	-0.08	4.89
03/17/11 10:34:37	13920	12.66	2.48	0.74	0.03	4.88
03/17/11 10:35:07	13950	12.68	2.48	0.82	0.00	4.90
03/17/11 10:35:37	13980	12.67	2.42	0.75	-0.09	4.88
03/17/11 10:36:07	14010	12.69	2.42	0.78	-0.04	4.89
03/17/11 10:36:37	14040	12.69	2.41	0.83	0.01	4.88
03/17/11 10:37:07	14070	12.70	2.44	0.72	-0.09	4.88
03/17/11 10:37:37	14100	12.69	2.45	0.75	-0.11	4.89
03/17/11 10:38:07	14130	12.68	2.47	0.70	-0.04	4.89
03/17/11 10:38:37	14160	12.66	2.52	0.70	-0.11	4.91
03/17/11 10:39:07	14190	12.69	2.54	0.67	-0.16	4.90
03/17/11 10:39:37	14220	12.72	2.53	0.72	-0.11	4.88
03/17/11 10:40:07	14250	12.71	2.48	0.81	-0.15	4.89
03/17/11 10:40:37	14280	12.67	2.45	0.78	-0.19	4.89
03/17/11 10:41:07	14310	12.68	2.48	0.75	-0.13	4.91
03/17/11 10:41:37	14340	12.70	2.54	0.74	-0.15	4.89

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,841	lb/min
Duct Burner Fuel Flow	127	lb/min
Total Fuel Flow	2,753,997	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	56
Ambient Temperature	74
Specific Humidity	0.009899

Unit Data

Unit Load	251.3	megawatts
Heat Input	2,370	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,657,694	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/17/11 10:42:07	14370	12.67	2.52	0.81	-0.22	4.91
03/17/11 10:42:37	14400	12.66	2.52	0.69	-0.16	4.93
03/17/11 10:43:07	14430	12.66	2.56	0.74	-0.12	4.92
03/17/11 10:43:37	14460	12.69	2.55	0.73	-0.19	4.93
03/17/11 10:44:07	14490	12.69	2.48	0.83	-0.20	4.92
03/17/11 10:44:37	14520	12.72	2.42	0.84	-0.15	4.90
03/17/11 10:45:07	14550	12.74	2.45	0.87	-0.21	4.90
03/17/11 10:45:37	14580	12.73	2.49	0.88	-0.27	4.90
03/17/11 10:46:07	14610	12.70	2.57	0.77	-0.23	4.92
03/17/11 10:46:37	14640	12.69	2.50	0.75	-0.26	4.94
03/17/11 10:47:07	14670	12.68	2.60	0.67	-0.33	4.92
03/17/11 10:47:37	14700	12.70	2.66	0.63	-0.29	4.92
03/17/11 10:48:07	14730	12.73	2.60	0.74	-0.26	4.90
03/17/11 10:48:37	14760	12.73	2.54	0.78	-0.33	4.88
03/17/11 10:49:07	14790	12.72	2.49	0.79	-0.20	4.90
03/17/11 10:49:37	14820	12.71	2.49	0.70	0.30	4.90
03/17/11 10:50:07	14850	12.72	2.49	0.70	-0.13	4.90
03/17/11 10:50:37	14880	12.72	2.52	0.77	-0.21	4.91
03/17/11 10:51:07	14910	12.72	2.53	0.73	-0.28	4.89
03/17/11 10:51:37	14940	12.73	2.52	0.72	-0.24	4.91
03/17/11 10:52:07	14970	12.71	2.48	0.79	-0.24	4.91
03/17/11 10:52:37	15000	12.74	2.51	0.68	-0.31	4.90
03/17/11 10:53:07	15030	12.75	2.48	0.64	-0.33	4.91
03/17/11 10:53:37	15060	12.73	2.44	0.76	-0.33	4.89
03/17/11 10:54:07	15090	12.72	2.44	0.80	-0.40	4.91
03/17/11 10:54:37	15120	12.71	2.51	0.72	-0.42	4.92
03/17/11 10:55:07	15150	12.72	2.54	0.81	-0.41	4.89
03/17/11 10:55:37	15180	12.72	2.47	0.74	-0.46	4.91
03/17/11 10:56:07	15210	12.74	2.46	0.78	-0.47	4.90
03/17/11 10:56:37	15240	12.74	2.46	0.75	-0.43	4.90
03/17/11 10:57:07	15270	12.74	2.44	0.70	-0.46	4.90
03/17/11 10:57:37	15300	12.73	2.48	0.65	-0.51	4.89
03/17/11 10:58:07	15330	12.71	2.52	0.64	-0.48	4.92
03/17/11 10:58:37	15360	12.66	2.57	0.68	-0.49	4.95
03/17/11 10:59:07	15390	12.70	2.56	0.66	-0.51	4.93
03/17/11 10:59:37	15420	12.74	2.51	0.74	-0.50	4.91
03/17/11 11:00:07	15450	12.76	2.43	0.79	-0.52	4.90

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,841	lb/min
Duct Burner Fuel Flow	127	lb/min
Total Fuel Flow	2,753,997	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	56
Ambient Temperature	74
Specific Humidity	0.009899

Unit Data

Unit Load	251.3	megawatts
Heat Input	2,370	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,657,694	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 11:00:37	15480	12.76	2.36	0.88	-0.54	4.89
03/17/11 11:01:07	15510	12.74	2.34	0.72	-0.52	4.91
03/17/11 11:01:37	15540	12.73	2.41	0.69	-0.54	4.90
03/17/11 11:02:07	15570	12.72	2.54	0.68	-0.57	4.93
03/17/11 11:02:37	15600	12.72	2.63	0.59	-0.54	4.93
03/17/11 11:03:07	15630	12.74	2.63	0.69	-0.55	4.91
03/17/11 11:03:37	15660	12.75	2.59	0.76	-0.59	4.91
03/17/11 11:04:07	15690	12.77	2.50	0.79	-0.56	4.89
03/17/11 11:04:37	15720	12.76	2.40	0.80	-0.55	4.90
RAW AVERAGE		**12.70**	**2.58**	**0.77**	**-0.23**	**4.87**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	0.03	0.18	0.13	-0.15	0.00
	Final Zero	0.47	0.18	-0.16	-0.27	0.17
	Avg. Zero	0.25	0.18	-0.02	-0.21	0.09
	Initial UpScale	12.12	5.06	5.28	2.64	8.80
	Final UpScale	12.54	4.96	5.01	2.61	8.76
	Avg. UpScale	12.33	5.01	5.15	2.63	8.78
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.47	2.45	0.75	0.00	4.91
Concentration (ppm@ 15%O_2)	N/A	1.72	0.52	0.00	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.76	0.53	0.00	N/A
Emission Rate (lb/hr)	N/A	16.59	3.07	0.00	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	72.67	13.46	0.00	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.000	N/A

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,818	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,785,350	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	42
Ambient Temperature	81
Specific Humidity	0.009349

Unit Data

Unit Load	247.9	megawatts
Heat Input	2,397	MMBtu/hr
Combustor Inlet Pressure	269	psig
NH_3 Injection Rate	257	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,567,092	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/17/11 11:25:07	16950	12.75	2.45	0.56	-0.18	4.91
03/17/11 11:25:37	16980	12.74	2.51	0.60	-0.10	4.93
03/17/11 11:26:07	17010	12.76	2.53	0.60	-0.15	4.93
03/17/11 11:26:37	17040	12.77	2.52	0.72	-0.18	4.90
03/17/11 11:27:07	17070	12.77	2.46	0.64	-0.13	4.92
03/17/11 11:27:37	17100	12.76	2.45	0.60	-0.17	4.92
03/17/11 11:28:07	17130	12.77	2.45	0.67	-0.09	4.93
03/17/11 11:28:37	17160	12.75	2.47	0.73	0.15	4.95
03/17/11 11:29:07	17190	12.73	2.46	0.57	0.11	4.95
03/17/11 11:29:37	17220	12.68	2.50	0.51	0.06	4.98
03/17/11 11:30:07	17250	12.74	2.54	0.55	0.16	4.98
03/17/11 11:30:37	17280	12.76	2.43	0.60	0.15	4.96
03/17/11 11:31:07	17310	12.78	2.27	0.80	0.09	4.96
03/17/11 11:31:37	17340	12.76	2.18	0.72	0.19	4.96
03/17/11 11:32:07	17370	12.80	2.16	0.69	0.23	4.95
03/17/11 11:32:37	17400	12.78	2.17	0.73	0.16	4.96
03/17/11 11:33:07	17430	12.76	2.22	0.58	0.16	4.96
03/17/11 11:33:37	17460	12.77	2.34	0.61	0.21	4.96
03/17/11 11:34:07	17490	12.78	2.38	0.57	0.16	4.97
03/17/11 11:34:37	17520	12.80	2.37	0.67	0.18	4.94
03/17/11 11:35:07	17550	12.82	2.34	0.74	0.26	4.94
03/17/11 11:35:37	17580	12.79	2.31	0.69	0.22	4.95
03/17/11 11:36:07	17610	12.76	2.40	0.55	0.17	4.95
03/17/11 11:36:37	17640	12.73	2.49	0.45	0.23	4.98
03/17/11 11:37:07	17670	12.73	2.56	0.51	0.23	4.99
03/17/11 11:37:37	17700	12.75	2.61	0.50	0.17	4.98
03/17/11 11:38:07	17730	12.83	2.45	0.62	0.25	4.95
03/17/11 11:38:37	17760	12.82	2.24	0.69	0.23	4.94
03/17/11 11:39:07	17790	12.80	2.10	0.73	0.19	4.96
03/17/11 11:39:37	17820	12.78	2.15	0.59	0.25	4.98
03/17/11 11:40:07	17850	12.78	2.20	0.57	0.22	4.98
03/17/11 11:40:37	17880	12.76	2.27	0.58	0.25	4.99
03/17/11 11:41:07	17910	12.82	2.33	0.62	0.28	4.98
03/17/11 11:41:37	17940	12.78	2.29	0.59	0.22	4.97
03/17/11 11:42:07	17970	12.73	2.31	0.51	0.34	5.01
03/17/11 11:42:37	18000	12.74	2.37	0.47	0.35	5.02
03/17/11 11:43:07	18030	12.82	2.34	0.60	0.25	4.97

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,818	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,785,350	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	42
Ambient Temperature	81
Specific Humidity	0.009349

Unit Data

Unit Load	247.9	megawatts
Heat Input	2,397	MMBtu/hr
Combustor Inlet Pressure	269	psig
NH_3 Injection Rate	257	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,567,092	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 11:43:37	18060	12.84	2.19	0.76	0.33	4.96
03/17/11 11:44:07	18090	12.83	2.12	0.71	0.37	4.97
03/17/11 11:44:37	18120	12.87	2.17	0.64	0.30	4.93
03/17/11 11:45:07	18150	12.87	2.16	0.69	0.28	4.94
03/17/11 11:45:37	18180	12.85	2.23	0.64	0.33	4.96
03/17/11 11:46:07	18210	12.84	2.35	0.64	0.31	4.96
03/17/11 11:46:37	18240	12.82	2.42	0.56	0.29	4.99
03/17/11 11:47:07	18270	12.79	2.49	0.51	0.36	5.01
03/17/11 11:47:37	18300	12.78	2.53	0.57	0.32	5.01
03/17/11 11:48:07	18330	12.79	2.57	0.43	0.31	5.02
03/17/11 11:48:37	18360	12.83	2.51	0.48	0.37	5.01
03/17/11 11:49:07	18390	12.85	2.35	0.48	0.29	4.98
03/17/11 11:49:37	18420	12.82	2.24	0.57	0.30	5.00
03/17/11 11:50:07	18450	12.84	2.20	0.50	0.34	5.01
03/17/11 11:50:37	18480	12.80	2.15	0.57	0.29	5.01
03/17/11 11:51:07	18510	12.82	2.18	0.49	0.28	5.01
03/17/11 11:51:37	18540	12.83	2.13	0.58	0.41	5.01
03/17/11 11:52:07	18570	12.85	2.23	0.58	0.36	4.99
03/17/11 11:52:37	18600	12.87	2.28	0.54	0.32	4.99
03/17/11 11:53:07	18630	12.91	2.24	0.60	0.39	4.97
03/17/11 11:53:37	18660	12.85	2.19	0.67	0.39	4.96
03/17/11 11:54:07	18690	12.83	2.32	0.59	0.31	4.99
03/17/11 11:54:37	18720	12.82	2.48	0.52	0.35	5.00
03/17/11 11:55:07	18750	12.81	2.59	0.42	0.37	4.99
03/17/11 11:55:37	18780	12.86	2.58	0.53	0.27	4.98
03/17/11 11:56:07	18810	12.87	2.51	0.50	0.28	4.96
03/17/11 11:56:37	18840	12.84	2.46	0.50	0.31	4.97
03/17/11 11:57:07	18870	12.86	2.50	0.46	0.26	4.98
03/17/11 11:57:37	18900	12.87	2.53	0.41	0.26	4.98
03/17/11 11:58:07	18930	12.88	2.51	0.37	0.37	4.95
03/17/11 11:58:37	18960	12.81	2.47	0.61	0.32	4.99
03/17/11 11:59:07	18990	12.87	2.56	0.47	0.24	4.98
03/17/11 11:59:37	19020	12.88	2.57	0.49	0.27	4.94
03/17/11 12:00:07	19050	12.89	2.47	0.64	0.29	4.95
03/17/11 12:00:37	19080	12.85	2.48	0.58	0.22	4.97
03/17/11 12:01:07	19110	12.87	2.61	0.50	0.25	4.95
03/17/11 12:01:37	19140	12.85	2.71	0.48	0.43	4.97

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,818	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,785,350	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	42
Ambient Temperature	81
Specific Humidity	0.009349

Unit Data

Unit Load	247.9	megawatts
Heat Input	2,397	MMBtu/hr
Combustor Inlet Pressure	269	psig
NH_3 Injection Rate	257	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,567,092	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 12:02:07	19170	12.85	2.76	0.45	0.34	4.97
03/17/11 12:02:37	19200	12.86	2.78	0.42	0.30	4.95
03/17/11 12:03:07	19230	12.89	2.77	0.44	0.40	4.95
03/17/11 12:03:37	19260	12.88	2.66	0.47	0.36	4.95
03/17/11 12:04:07	19290	12.86	2.64	0.45	0.40	4.95
03/17/11 12:04:37	19320	12.85	2.70	0.49	0.57	4.97
03/17/11 12:05:07	19350	12.91	2.77	0.47	0.83	4.96
03/17/11 12:05:37	19380	12.94	3.05	0.47	1.26	4.92
03/17/11 12:06:07	19410	12.95	3.23	0.38	2.62	4.91
03/17/11 12:06:37	19440	12.95	3.19	0.41	1.82	4.91
03/17/11 12:07:07	19470	12.96	3.15	0.37	1.44	4.90
03/17/11 12:07:37	19500	12.95	3.11	0.29	1.34	4.91
03/17/11 12:08:07	19530	12.97	3.12	0.34	1.66	4.92
03/17/11 12:08:37	19560	12.96	3.07	0.46	2.70	4.92
03/17/11 12:09:07	19590	12.95	3.10	0.34	2.85	4.94
03/17/11 12:09:37	19620	12.91	3.13	0.36	2.48	4.97
03/17/11 12:10:07	19650	12.88	3.17	0.40	1.86	4.98
03/17/11 12:10:37	19680	12.88	3.25	0.23	2.12	4.99
03/17/11 12:11:07	19710	12.91	3.14	0.33	1.84	4.98
03/17/11 12:11:37	19740	12.94	2.93	0.40	2.27	4.95
03/17/11 12:12:07	19770	12.95	2.67	0.56	2.31	4.95
03/17/11 12:12:37	19800	12.94	2.55	0.56	2.11	4.96
03/17/11 12:13:07	19830	12.93	2.57	0.57	1.79	4.97
03/17/11 12:13:37	19860	12.97	2.65	0.41	1.88	4.96
03/17/11 12:14:07	19890	13.02	2.75	0.53	2.00	4.94
03/17/11 12:14:37	19920	13.00	2.72	0.64	1.78	4.94
03/17/11 12:15:07	19950	12.98	2.79	0.60	1.81	4.94
03/17/11 12:15:37	19980	12.96	2.95	0.42	1.85	4.97
03/17/11 12:16:07	20010	12.97	3.11	0.44	1.61	4.97
03/17/11 12:16:37	20040	12.92	3.22	0.39	1.66	4.97
03/17/11 12:17:07	20070	12.92	3.35	0.26	1.73	4.99
03/17/11 12:17:37	20100	12.93	3.35	0.28	1.49	4.98
03/17/11 12:18:07	20130	13.02	3.17	0.33	1.44	4.92
03/17/11 12:18:37	20160	13.07	2.87	0.62	1.65	4.90
03/17/11 12:19:07	20190	13.05	2.67	0.75	1.49	4.91
03/17/11 12:19:37	20220	13.00	2.65	0.50	1.43	4.92
03/17/11 12:20:07	20250	13.00	2.80	0.42	1.52	4.94

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,818	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,785,350	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	42
Ambient Temperature	81
Specific Humidity	0.009349

Unit Data

Unit Load	247.9	megawatts
Heat Input	2,397	MMBtu/hr
Combustor Inlet Pressure	269	psig
NH_3 Injection Rate	257	lb/hr
Meas. Stack Moisture	10.1	%
Stack Exhaust Flow (M19)	56,567,092	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 12:20:37	20280	12.97	2.95	0.33	1.34	4.96
03/17/11 12:21:07	20310	12.95	3.06	0.39	1.30	4.97
03/17/11 12:21:37	20340	12.93	3.17	0.26	1.47	4.98
03/17/11 12:22:07	20370	12.88	3.22	0.24	1.36	5.01
03/17/11 12:22:37	20400	12.91	3.24	0.33	1.38	5.00
03/17/11 12:23:07	20430	12.99	3.09	0.26	1.39	4.97
03/17/11 12:23:37	20460	12.99	2.76	0.41	1.24	4.96
03/17/11 12:24:07	20490	12.93	2.59	0.36	1.30	4.99
03/17/11 12:24:37	20520	12.91	2.65	0.34	1.31	5.00
RAW AVERAGE		**12.86**	**2.59**	**0.52**	**0.73**	**4.96**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
	Initial Zero	0.47	0.18	-0.16	-0.27	0.17
	Final Zero	0.65	0.16	-0.34	-0.05	0.28
	Avg. Zero	0.56	0.17	-0.25	-0.16	0.23
Bias						
	Initial UpScale	12.54	4.96	5.01	2.96	8.76
	Final UpScale	12.65	4.92	4.73	2.98	8.92
	Avg. UpScale	12.60	4.94	4.87	2.97	8.84
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.36	2.50	0.73	0.90	4.90
Concentration (ppm@ 15%O_2)	N/A	1.73	0.51	0.62	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.72	0.50	0.62	N/A
Emission Rate (lb/hr)	N/A	16.92	3.02	2.12	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	74.10	13.22	9.27	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.001	N/A

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,811	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,776,227	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	34
Ambient Temperature	84
Specific Humidity	0.008332

Unit Data

Unit Load	244.4	megawatts
Heat Input	2,389	MMBtu/hr
Combustor Inlet Pressure	266	psig
NH_3 Injection Rate	253	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	56,267,762	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/17/11 12:43:07	21630	12.27	3.17	0.31	0.22	5.08
03/17/11 12:43:37	21660	12.33	3.18	0.38	0.32	5.04
03/17/11 12:44:07	21690	12.37	2.96	0.51	0.27	5.00
03/17/11 12:44:37	21720	12.31	2.81	0.55	0.28	5.02
03/17/11 12:45:07	21750	12.28	2.87	0.47	0.37	5.06
03/17/11 12:45:37	21780	12.25	2.99	0.47	0.32	5.05
03/17/11 12:46:07	21810	12.28	3.04	0.37	0.35	5.06
03/17/11 12:46:37	21840	12.34	2.94	0.50	0.39	5.03
03/17/11 12:47:07	21870	12.35	2.75	0.57	0.33	5.00
03/17/11 12:47:37	21900	12.26	2.71	0.67	0.28	5.04
03/17/11 12:48:07	21930	12.23	2.78	0.37	0.30	5.07
03/17/11 12:48:37	21960	12.22	2.87	0.55	0.21	5.06
03/17/11 12:49:07	21990	12.27	2.93	0.50	0.28	5.06
03/17/11 12:49:37	22020	12.35	2.90	0.62	0.41	5.01
03/17/11 12:50:07	22050	12.33	2.70	0.70	0.40	5.01
03/17/11 12:50:37	22080	12.29	2.69	0.55	0.33	5.04
03/17/11 12:51:07	22110	12.29	2.80	0.51	0.41	5.04
03/17/11 12:51:37	22140	12.29	2.92	0.49	0.48	5.03
03/17/11 12:52:07	22170	12.28	3.03	0.47	0.49	5.04
03/17/11 12:52:37	22200	12.26	3.09	0.48	0.59	5.04
03/17/11 12:53:07	22230	12.22	3.14	0.43	0.57	5.05
03/17/11 12:53:37	22260	12.23	3.16	0.47	0.56	5.07
03/17/11 12:54:07	22290	12.27	3.09	0.45	0.62	5.05
03/17/11 12:54:37	22320	12.30	2.94	0.52	0.55	5.02
03/17/11 12:55:07	22350	12.29	2.83	0.51	0.52	5.03
03/17/11 12:55:37	22380	12.30	2.83	0.47	0.59	5.01
03/17/11 12:56:07	22410	12.31	2.88	0.51	0.54	5.01
03/17/11 12:56:37	22440	12.31	2.89	0.63	0.52	5.00
03/17/11 12:57:07	22470	12.28	2.93	0.61	0.63	5.00
03/17/11 12:57:37	22500	12.22	3.10	0.55	0.62	5.03
03/17/11 12:58:07	22530	12.18	3.24	0.52	0.59	5.06
03/17/11 12:58:37	22560	12.21	3.36	0.41	0.68	5.04
03/17/11 12:59:07	22590	12.29	3.25	0.48	0.71	5.01
03/17/11 12:59:37	22620	12.31	2.97	0.63	0.64	5.00
03/17/11 13:00:07	22650	12.31	2.75	0.66	0.71	4.98
03/17/11 13:00:37	22680	12.30	2.76	0.67	0.78	4.98
03/17/11 13:01:07	22710	12.29	2.78	0.61	0.72	5.00

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,811	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,776,227	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	34
Ambient Temperature	84
Specific Humidity	0.008332

Unit Data

Unit Load	244.4	megawatts
Heat Input	2,389	MMBtu/hr
Combustor Inlet Pressure	266	psig
NH_3 Injection Rate	253	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	56,267,762	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 13:01:37	22740	12.28	2.86	0.49	0.73	4.98
03/17/11 13:02:07	22770	12.27	2.99	0.61	0.81	4.99
03/17/11 13:02:37	22800	12.28	3.08	0.47	0.77	4.98
03/17/11 13:03:07	22830	12.27	3.10	0.45	0.70	4.97
03/17/11 13:03:37	22860	12.24	3.15	0.56	0.77	5.00
03/17/11 13:04:07	22890	12.24	3.20	0.47	0.82	4.99
03/17/11 13:04:37	22920	12.21	3.23	0.56	0.74	5.00
03/17/11 13:05:07	22950	12.20	3.23	0.45	0.77	5.02
03/17/11 13:05:37	22980	12.19	3.21	0.46	0.82	5.01
03/17/11 13:06:07	23010	12.19	3.09	0.48	0.75	5.03
03/17/11 13:06:37	23040	12.22	2.97	0.52	0.74	5.02
03/17/11 13:07:07	23070	12.28	2.78	0.63	0.79	4.98
03/17/11 13:07:37	23100	12.19	2.63	0.62	0.70	5.02
03/17/11 13:08:07	23130	12.15	2.39	0.67	0.70	5.05
03/17/11 13:08:37	23160	12.10	2.44	0.71	0.77	5.07
03/17/11 13:09:07	23190	12.08	2.57	0.56	0.71	5.10
03/17/11 13:09:37	23220	12.04	2.67	0.58	0.62	5.12
03/17/11 13:10:07	23250	12.07	2.74	0.53	0.70	5.11
03/17/11 13:10:37	23280	12.11	2.70	0.63	0.81	5.09
03/17/11 13:11:07	23310	12.09	2.54	0.72	0.79	5.09
03/17/11 13:11:37	23340	12.08	2.49	0.66	0.78	5.11
03/17/11 13:12:07	23370	12.14	2.49	0.67	0.86	5.09
03/17/11 13:12:37	23400	12.14	2.48	0.73	0.80	5.07
03/17/11 13:13:07	23430	12.10	2.48	0.73	0.80	5.11
03/17/11 13:13:37	23460	12.09	2.58	0.68	0.90	5.10
03/17/11 13:14:07	23490	12.07	2.70	0.66	0.86	5.14
03/17/11 13:14:37	23520	12.05	2.80	0.62	0.84	5.16
03/17/11 13:15:07	23550	12.08	2.87	0.63	0.92	5.13
03/17/11 13:15:37	23580	12.11	2.74	0.68	0.93	5.13
03/17/11 13:16:07	23610	12.11	2.64	0.69	0.84	5.12
03/17/11 13:16:37	23640	12.11	2.64	0.67	0.93	5.11
03/17/11 13:17:07	23670	12.16	2.68	0.79	0.92	5.09
03/17/11 13:17:37	23700	12.12	2.67	0.80	0.93	5.08
03/17/11 13:18:07	23730	12.09	2.71	0.76	0.98	5.10
03/17/11 13:18:37	23760	12.09	2.81	0.74	0.94	5.10
03/17/11 13:19:07	23790	12.07	2.91	0.60	0.95	5.10
03/17/11 13:19:37	23820	12.06	2.97	0.59	1.02	5.12

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,811	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,776,227	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	34
Ambient Temperature	84
Specific Humidity	0.008332

Unit Data

Unit Load	244.4	megawatts
Heat Input	2,389	MMBtu/hr
Combustor Inlet Pressure	266	psig
NH_3 Injection Rate	253	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	56,267,762	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/17/11 13:20:07	23850	12.09	2.96	0.65	1.00	5.11
03/17/11 13:20:37	23880	12.13	2.86	0.71	0.95	5.07
03/17/11 13:21:07	23910	12.11	2.71	0.75	1.01	5.08
03/17/11 13:21:37	23940	12.06	2.72	0.68	1.05	5.09
03/17/11 13:22:07	23970	12.04	2.85	0.62	0.96	5.12
03/17/11 13:22:37	24000	11.98	2.87	0.61	1.01	5.15
03/17/11 13:23:07	24030	11.98	2.81	0.53	1.05	5.17
03/17/11 13:23:37	24060	12.01	2.72	0.64	1.00	5.17
03/17/11 13:24:07	24090	12.05	2.56	0.78	1.06	5.13
03/17/11 13:24:37	24120	12.09	2.32	0.79	1.10	5.11
03/17/11 13:25:07	24150	12.10	2.16	0.84	1.01	5.10
03/17/11 13:25:37	24180	12.08	2.11	0.86	1.01	5.11
03/17/11 13:26:07	24210	12.08	2.17	0.92	1.08	5.12
03/17/11 13:26:37	24240	12.08	2.23	0.91	1.06	5.10
03/17/11 13:27:07	24270	12.08	2.30	0.68	1.01	5.11
03/17/11 13:27:37	24300	12.06	2.37	0.78	1.07	5.11
03/17/11 13:28:07	24330	12.04	2.41	0.71	1.09	5.13
03/17/11 13:28:37	24360	12.03	2.47	0.61	1.04	5.16
03/17/11 13:29:07	24390	12.00	2.53	0.66	1.10	5.15
03/17/11 13:29:37	24420	12.09	2.57	0.76	1.13	5.12
03/17/11 13:30:07	24450	12.13	2.39	0.90	1.07	5.07
03/17/11 13:30:37	24480	12.09	2.24	0.89	1.11	5.08
03/17/11 13:31:07	24510	12.07	2.25	0.84	1.13	5.10
03/17/11 13:31:37	24540	12.04	2.31	0.71	1.09	5.10
03/17/11 13:32:07	24570	12.03	2.34	0.72	1.15	5.13
03/17/11 13:32:37	24600	12.03	2.39	0.67	1.18	5.12
03/17/11 13:33:07	24630	12.03	2.42	0.68	1.14	5.12
03/17/11 13:33:37	24660	12.02	2.46	0.74	1.19	5.14
03/17/11 13:34:07	24690	12.05	2.42	0.65	1.21	5.10
03/17/11 13:34:37	24720	12.05	2.30	0.72	1.12	5.12
03/17/11 13:35:07	24750	11.98	2.28	0.75	1.10	5.14
03/17/11 13:35:37	24780	12.02	2.32	0.78	1.20	5.14
03/17/11 13:36:07	24810	12.11	2.30	0.87	1.22	5.09
03/17/11 13:36:37	24840	12.09	2.17	0.99	1.17	5.06
03/17/11 13:37:07	24870	12.07	2.15	0.85	1.23	5.09
03/17/11 13:37:37	24900	12.03	2.21	0.84	1.25	5.09
03/17/11 13:38:07	24930	12.00	2.30	0.80	1.20	5.12

Florida Power and Light
March 17, 2011
Mitsubishi, 501G, Unit 3A
West County Energy Center

Fuel Data

Fuel Fd factor	8,681	SCF exh/MMBtu
Fuel Heating Value (HHV)	955	Btu/SCF fuel
Turbine Fuel Flow	1,811	lb/min
Duct Burner Fuel Flow	173	lb/min
Total Fuel Flow	2,776,227	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	34
Ambient Temperature	84
Specific Humidity	0.008332

Unit Data

Unit Load	244.4	megawatts
Heat Input	2,389	MMBtu/hr
Combustor Inlet Pressure	266	psig
NH_3 Injection Rate	253	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	56,267,762	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/17/11 13:38:37	24960	11.98	2.38	0.74	1.23	5.14
03/17/11 13:39:07	24990	12.00	2.38	0.77	1.26	5.13
03/17/11 13:39:37	25020	12.05	2.39	0.73	1.24	5.12
03/17/11 13:40:07	25050	12.05	2.33	0.76	1.27	5.08
03/17/11 13:40:37	25080	12.03	2.31	0.81	1.21	5.10
03/17/11 13:41:07	25110	12.04	2.35	0.79	1.24	5.11
03/17/11 13:41:37	25140	12.04	2.40	0.72	1.27	5.10
03/17/11 13:42:07	25170	12.04	2.41	0.72	1.22	5.10
03/17/11 13:42:37	25200	12.02	2.37	0.80	1.22	5.10
RAW AVERAGE		**12.15**	**2.70**	**0.64**	**0.83**	**5.07**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	0.02	0.16	-0.34	-0.05	0.28
	Final Zero	-0.29	0.09	-0.05	0.06	0.35
	Avg. Zero	-0.14	0.13	-0.20	0.01	0.32
	Initial UpScale	12.03	4.92	4.73	2.98	8.92
	Final UpScale	11.78	4.98	5.13	3.00	9.05
	Avg. UpScale	11.91	4.95	4.93	2.99	8.99
Upscale Cal Gas		12.10	4.93	4.89	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.35	2.63	0.80	0.89	4.89
Concentration (ppm@ 15%O_2)	N/A	1.81	0.55	0.61	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.75	0.53	0.59	N/A
Emission Rate (lb/hr)	N/A	17.65	3.26	2.07	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	77.33	14.27	9.08	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.001	N/A

TEST RESULTS

NH_3 Emissions
Base Load

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3A
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/16/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3A	
Base Run Number		Base	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	03/16/11	03/16/11	03/16/11	
Load	% or w/DB	Base	Base	Base	
Fuel F-Factor		8641.06	8641.06	8641.06	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	($\Delta H_@$)	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

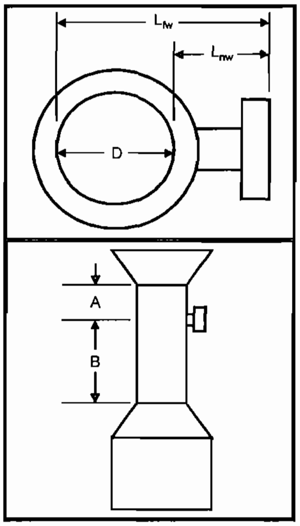
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/16/11
Sampling Location	Unit 3A	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²

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[1] 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

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

● Method 1 Trav ○ 12 Point PM Trav ○ Velocit

Location of Traverse Points in Circular Stacks									
Traverse	*(Fraction of Stack Diameter from Inside Wall to Traverse Point)*								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center		
Sampling Location	Unit 3A		
Operator	TG		
Project #	bv-10-westcounty.fl-comp#2		
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/16/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft^2
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.42	%vd
Oxygen Concentration	(%O_2)	13.13	%vd
Carbon Monoxide Concentration	(ppmCO)	0.82	ppmvd
Nitrogen Concentration	(%N_2)	82.45	%vd
Stack Moisture Content	(B_{ws})	9.27	%
Stack Dry Molecular Weight	(M_d)	29.23	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.19	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	66.25	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	59,670,752	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	994,513	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,504,022	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	65,767,389	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):

If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number	Base-V1			
Run Time	07:45	**Start**	08:15	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(i)}$)
	in H_2O	deg	°F	ft/sec
A-1	0.88	0	276	62.52
A-2	0.91	0	277	63.62
A-3	0.91	0	277	63.62
A-4	0.90	0	276	63.23
A-5	0.80	0	275	59.57
A-6	0.50	0	269	46.90
B-1	0.81	0	274	59.90
B-2	0.85	0	270	61.20
B-3	0.85	0	269	61.15
B-4	0.82	0	269	60.06
B-5	0.68	0	269	54.70
B-6	0.50	0	266	46.81
C-1	0.94	0	276	64.62
C-2	1.30	0	275	75.94
C-3	1.30	0	273	75.84
C-4	1.40	0	272	78.64
C-5	1.40	0	271	78.59
C-6	1.10	0	267	69.47
D-1	1.00	0	284	67.01
D-2	1.20	0	280	73.21
D-3	1.30	0	280	76.20
D-4	1.30	0	279	76.15
D-5	1.50	0	278	81.74
D-6	1.10	0	272	69.71
Average	1.01	0	274	
	1.00	**= Square roots of Δp**		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/16/11		
Sampling Location	Unit 3A	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data

Run Number	Base-1		**Run Start Time**		09:47	**Run Stop Time**	11:00	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:13	4.4	13.1	0.9	82.5	29.23	1.763	150.7	YES

Gas Analysis Data

Run Number	Base-2		**Run Start Time**		11:12	**Run Stop Time**	12:26	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:14	4.4	13.1	0.9	82.5	29.23	1.765	151.0	YES

Gas Analysis Data

Run Number	Base-3		**Run Start Time**		12:40	**Run Stop Time**	18:48	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
06:08	4.4	13.2	0.7	82.4	29.24	1.740	154.8	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/16/11
Sampling Location	Unit 3A	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data

Run Number		Base-1		**Run Start Time**		09:47	**Run Stop Time**		11:00
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	46.550	dcf	**Barometric Pressure**		(P_b)	30.25	in Hg
Average Stack Temp		$(t_s)_{avg}$	274	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	110	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.85	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	789.80	746.90	613.40	806.10				
Initial Value	$(V_i),(W_i)$	729.60	726.50	609.50	798.30				
Net Value	$(V_n),(W_n)$	60.2	20.4	3.9	7.8				
Results									
Total Weight		(W_t)	92.30	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.352	scf
Std Meter Volume		$(V_{m(std)})$	43.365	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.12	%	**Final Moisture Content**		(B_{ws})	9.12	%

Moisture Content Data

Run Number		Base-2		**Run Start Time**		11:12	**Run Stop Time**		12:26
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.670	dcf	**Barometric Pressure**		(P_b)	30.24	in Hg
Average Stack Temp		$(t_s)_{avg}$	275	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	109	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.91	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	801.50	741.90	623.10	880.90				
Initial Value	$(V_i),(W_i)$	743.40	722.00	615.20	870.20				
Net Value	$(V_n),(W_n)$	58.1	19.9	7.9	10.7				
Results									
Total Weight		(W_t)	96.60	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.555	scf
Std Meter Volume		$(V_{m(std)})$	44.544	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.28	%	**Final Moisture Content**		(B_{ws})	9.28	%

Moisture Content Data

Run Number		Base-3		**Run Start Time**		12:40	**Run Stop Time**		18:48
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	46.350	dcf	**Barometric Pressure**		(P_b)	30.25	in Hg
Average Stack Temp		$(t_s)_{avg}$	260	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	102	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.86	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	787.20	760.20	611.90	848.80				
Initial Value	$(V_i),(W_i)$	721.80	745.10	608.80	835.90				
Net Value	$(V_n),(W_n)$	65.4	15.1	3.1	12.9				
Results									
Total Weight		(W_t)	96.50	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.550	scf
Std Meter Volume		$(V_{m(std)})$	43.808	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.41	%	**Final Moisture Content**		(B_{ws})	9.41	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/16/11
Operator	TG
Run Number	Base-1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	273.9	°F
Average Meter Temp	(t_m)	110.4	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}_{avg})$	1.00	in H_2O
Stack Moisture Content	(B_{ws})	9.12	%
Stack Dry Molecular Weight	(M_d)	29.23	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.94	

Leak Checks					
Train	**Pre**	0.000	ft^3/min@	15.0	in Hg
PASS	**Post**	0.000	ft^3/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2110	In
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg
Absolute Meter Pressure	(P_m)	30.38	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	09:47	**End**	11:00

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	729.6	726.5	809.5	798.3				
Post	789.8	746.9	813.4	806.1				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	***Dry Gas* Meter Reading (V_m)**	**Velocity Head (Δp)**	***Desired* Orifice ΔH (ΔH_d)**	***Actual* Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	***Impinger* Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	***Meter* Inlet Temp (t_{mi})**	***Meter* Outlet Temp (t_{mo})**	***Pump* Vacuum**	***Square* Root ΔP $(\Delta p^{1/2})$**	***Local* Stack Velocity $(v_s)_i$**	***Cumul.* Meter Volume $(V_m)_{std}$**	***Cumul.* Percent IsoKinetic (I)**	***Est-Run* Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	408.820	0.88	1.710	1.80	276	251	258	67			111	111	1.0	0.94	62.50	1.786	100.0	42.858
A-2	2.5	00:02:30	410.740	0.91	1.769	1.70	277	249	255	61			113	109	1.0	0.95	63.60	3.656	101.6	43.868
A-3	5.0	00:05:00	412.750	0.91	1.769	1.70	277	246	252	80			111	107	1.0	0.95	63.60	5.103	95.4	40.822
A-4	7.5	00:07:30	414.300	0.90	1.749	1.80	276	249	258	58			113	112	1.0	0.95	63.21	6.706	93.8	40.245
A-5	10.0	00:10:00	416.030	0.80	1.555	1.50	275	245	255	59			112	107	1.0	0.89	59.55	8.134	92.1	39.043
A-6	12.5	00:12:30	417.560	0.50	0.972	0.90	269	249	255	60			113	107	1.0	0.71	48.89	9.631	95.0	38.526
B-1	15.0	00:15:00	419.170	0.81	1.574	1.50	274	254	258	65			110	107	1.0	0.90	59.88	11.303	95.3	38.754
B-2	17.5	00:17:30	420.960	0.65	1.652	1.50	270	252	256	61			115	107	1.0	0.92	61.18	13.033	95.7	39.098
B-3	20.0	00:20:00	422.820	0.85	1.652	1.50	269	253	256	59			116	108	1.0	0.92	61.14	14.685	95.5	39.160
B-4	22.5	00:22:30	424.800	0.82	1.594	1.50	269	251	256	59			118	110	1.0	0.91	60.05	16.376	95.7	39.307
B-5	25.0	00:25:00	426.430	0.68	1.322	1.20	269	253	257	81			118	111	1.0	0.82	54.68	18.059	96.7	39.401
B-6	27.5	00:27:30	428.250	0.50	0.972	0.90	266	254	256	62			117	112	1.0	0.71	46.79	19.387	96.8	38.775
C-1	30.0	00:30:00	429.690	0.94	1.827	1.70	276	254	251	67			112	110	1.0	0.97	64.60	21.081	96.4	38.918
C-2	32.5	00:32:30	431.510	1.30	2.526	2.40	275	247	253	64			116	111	2.0	1.14	75.92	23.066	96.0	39.542
C-3	35.0	00:35:00	433.650	1.30	2.528	2.40	273	248	251	58			114	110	2.0	1.14	75.81	25.103	95.8	40.165
C-4	37.5	00:37:30	435.840	1.40	2.721	2.60	272	249	258	54			115	110	2.0	1.18	78.62	27.131	95.3	40.696
C-5	40.0	00:40:00	438.020	1.40	2.721	2.60	271	252	249	52			113	110	2.0	1.18	78.57	29.329	95.5	41.406
C-6	42.5	00:42:30	440.380	1.10	2.138	2.00	267	249	254	52			111	110	2.0	1.05	69.45	31.332	95.8	41.776
D-1	45.0	00:45:00	442.530	1.00	1.943	1.80	284	247	260	68			107	108	1.0	1.00	66.99	33.139	95.7	41.860
D-2	47.5	00:47:30	444.460	1.20	2.332	2.20	280	248	260	65			108	108	2.0	1.10	73.19	35.237	96.1	42.284
D-3	50.0	00:50:00	446.700	1.30	2.526	2.40	280	249	256	63			107	107	2.0	1.14	76.17	37.170	95.7	42.480
D-4	52.5	00:52:30	448.760	1.30	2.526	2.40	279	247	251	65			107	105	2.0	1.14	76.12	39.201	95.6	42.764
D-5	55.0	00:55:00	450.920	1.50	2.915	2.70	278	250	254	66			107	105	3.0	1.22	81.71	41.393	95.5	43.192
D-6	57.5	00:57:30	453.250	1.10	2.138	2.00	272	246	255	66			109	105	2.0	1.05	69.69	43.380	95.7	43.380
Last Pt	60.0	01:00:00	455.370																	
Final Val	60.0	01:00:00	455.370											**Max Vac**	3.0	**Final Values**		43.380	95.7	
Average Values				1.01		1.85	274	250	255	61			112	109		1.00	66.25			
													110							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/16/11
Operator	TG
Run Number	Base-2

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	In H_2O for	15.0	sec

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	11:12	**End**	12:26

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2078	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	743.4	722.0	615.2	870.2				
Post	801.5	741.9	623.1	880.9				

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	275.2	°F
Average Meter Temp	(t_m)	108.6	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	0.99	in H_2O
Stack Moisture Content	(B_{ws})	9.28	%
Stack Dry Molecular Weight	(M_d)	29.23	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.93	

Pressures			
Barometric Pressure	(P_b)	30.24	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.30	in Hg
Absolute Meter Pressure	(P_m)	30.37	in Hg

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH_d)	Actual Orifice ΔH (ΔH_a)	Stack Temp (t_s)	Probe Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (≤68°F)	Cond. Temp (≤–°F)	CPM Filter Temp (–±–°F)	Meter Inlet Temp (t_{mi})	Meter Outlet Temp (t_{mo})	Pump Vacuum	Square Root ΔP ($\Delta p^{1/2}$)	Local Stack Velocity $(v_s)_i$	Cumul. Meter Volume $(V_m)_{std}$	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume $(V_m)_{std}$
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	455.640	1.10	2.121	2.10	270	251	252	88			108	105	2.0	1.05	69.63	1.933	98.6	46.389
A-2	2.5	00:02:30	457.700	1.20	2.314	2.30	273	251	255	67			112	105	2.0	1.10	72.87	3.944	96.5	47.329
A-3	5.0	00:05:00	459.850	1.20	2.314	2.30	275	248	254	64			114	105	1.0	1.10	72.97	5.980	96.9	47.838
A-4	7.5	00:07:30	462.030	1.40	2.700	2.70	276	248	257	63			115	106	2.0	1.18	78.87	8.191	97.3	49.147
A-5	10.0	00:10:00	464.400	1.50	2.893	2.90	276	248	257	63			114	107	3.0	1.22	81.64	10.497	97.7	50.385
A-6	12.5	00:12:30	466.870	1.10	2.121	2.10	274	252	254	63			114	107	2.0	1.05	69.82	12.509	98.2	50.038
B-1	15.0	00:15:00	469.030	1.00	1.928	1.90	280	251	254	68			109	107	2.0	1.00	66.84	14.446	98.7	49.528
B-2	17.5	00:17:30	471.100	1.20	2.314	2.30	278	254	256	66			112	107	2.0	1.10	73.12	16.509	98.8	49.528
B-3	20.0	00:20:00	473.310	1.30	2.507	2.50	278	251	258	67			113	108	2.0	1.14	76.11	18.467	98.0	49.297
B-4	22.5	00:22:30	475.430	1.30	2.507	2.50	276	258	255	67			113	108	2.0	1.14	76.01	20.622	98.1	49.493
B-5	25.0	00:25:00	477.720	1.40	2.700	2.70	275	248	254	67			114	107	2.0	1.18	78.82	22.834	98.1	49.819
B-6	27.5	00:27:30	480.090	1.10	2.121	2.10	269	252	254	67			114	108	2.0	1.05	69.58	24.844	98.3	49.689
C-1	30.0	00:30:00	482.250	0.70	1.350	1.30	279	257	253	68			107	107	1.0	0.84	55.89	26.819	100.2	49.511
C-2	32.5	00:32:30	484.360	0.79	1.523	1.50	273	248	255	64			110	108	1.0	0.89	59.13	28.162	99.2	48.277
C-3	35.0	00:35:00	485.800	0.83	1.601	1.60	272	249	255	61			108	107	1.0	0.91	60.57	29.827	99.0	47.723
C-4	37.5	00:37:30	487.580	0.75	1.446	1.40	270	249	251	55			105	106	1.0	0.87	57.49	31.450	99.0	47.176
C-5	40.0	00:40:00	489.310	0.72	1.388	1.40	270	252	259	53			108	106	1.0	0.85	56.33	33.032	98.9	46.633
C-6	42.5	00:42:30	491.000	0.46	0.887	0.88	265	254	252	51			109	105	1.0	0.68	44.87	34.341	99.0	45.788
D-1	45.0	00:45:00	492.400	0.81	1.562	1.60	285	252	250	64			109	107	1.0	0.90	60.36	36.210	99.6	45.739
D-2	47.5	00:47:30	494.400	0.86	1.658	1.70	279	249	255	64			110	106	1.0	0.93	61.94	37.781	99.1	45.337
D-3	50.0	00:50:00	496.080	0.91	1.755	1.70	278	247	253	63			110	106	1.0	0.95	63.68	40.015	100.5	45.732
D-4	52.5	00:52:30	498.470	0.80	1.543	1.50	278	248	254	63			110	106	1.0	0.89	59.70	41.286	99.7	45.039
D-5	55.0	00:55:00	499.830	0.81	1.562	1.50	278	248	254	63			110	106	1.0	0.90	60.08	42.940	99.6	44.807
D-6	57.5	00:57:30	501.600	0.74	1.427	1.40	278	246	254	65			108	106	1.0	0.86	57.42	44.540	99.5	44.540
Lest Pt	60.0	01:00:00	503.310																	
Final Val	60.0	01:00:00	503.310											**Max Vac**	3.0	**Final Values**		44.540	99.5	
Average Values				1.00		1.91	275	250	254	64			111	107		0.99	65.99			
													109							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/16/11
Operator	TG
Run Number	Base-3

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	260.4	°F
Average Meter Temp	(t_m)	102.3	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.97	in H_2O
Stack Moisture Content	(B_{ws})	9.41	%
Stack Dry Molecular Weight	(M_d)	29.24	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.74	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.94	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2117	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	*inconel*		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg
Absolute Meter Pressure	(P_m)	30.38	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	12:40	**End**	18:48

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	721.8	745.1	608.8	635.9				
Post	787.2	760.2	611.9	848.8				

Wash Volumes					ml
					ml

Note: Unit trip ~13:30, during last port change. Testing resumed at ~18:30

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	503.610	0.92	1.786	1.80	278	254	254	68			107	105	1.0	0.96	64.03	1.896	104.3	45.511
A-2	2.5	00:02:30	505.630	0.92	1.786	1.80	279	251	255	59			110	105	1.0	0.96	64.07	3.694	101.7	44.327
A-3	5.0	00:05:00	507.550	1.10	2.136	2.10	280	252	254	57			108	105	1.0	1.05	70.11	5.599	99.7	44.794
A-4	7.5	*00:07:30*	*509.580*	*1.40*	2.718	*2.70*	*280*	*249*	254	52			*107*	*104*	*2.0*	*1.18*	*79.09*	7.784	99.1	46.703
A-5	10.0	00:10:00	511.900	1.40	2.718	2.70	278	247	254	52			110	105	2.0	1.18	78.98	10.505	104.9	50.424
A-6	12.5	00:12:30	514.800	1.10	2.136	2.10	276	247	255	54			109	105	2.0	1.05	69.92	12.118	101.7	48.472
B-1	15.0	00:15:00	516.520	0.95	1.844	1.80	281	251	253	54			107	104	1.0	0.97	65.20	14.072	102.3	48.248
B-2	17.5	00:17:30	518.600	1.10	2.136	2.10	275	255	254	54			112	104	1.0	1.05	69.87	15.870	100.9	47.609
B-3	20.0	00:20:00	520.520	1.30	2.524	2.50	275	251	252	53			112	105	2.0	1.14	75.96	17.976	100.5	47.936
B-4	22.5	00:22:30	522.770	1.30	2.524	2.50	275	251	255	53			113	105	2.0	1.14	75.96	20.081	100.1	48.194
B-5	25.0	00:25:00	525.020	1.40	2.718	2.70	273	246	253	55			115	107	2.0	1.18	78.72	22.393	100.4	48.858
B-6	27.5	00:27:30	527.500	1.40	2.718	2.70	272	251	254	56			115	107	2.0	1.18	78.66	24.445	99.6	48.890
C-1	30.0	00:30:00	529.700	0.82	1.592	1.60	273	252	252	65			110	108	1.0	0.91	60.24	26.284	100.1	48.524
C-2	32.5	00:32:30	531.670	0.82	1.592	1.60	272	254	255	57			112	108	1.0	0.91	60.20	27.784	99.4	47.629
C-3	35.0	00:35:00	533.280	0.81	1.573	1.60	271	252	255	55			114	108	1.0	0.90	59.79	29.477	99.4	47.163
C-4	37.5	00:37:30	535.100	0.77	1.495	1.50	271	248	256	55			115	111	1.0	0.88	58.30	31.144	99.4	46.717
C-5	40.0	00:40:00	536.900	0.74	1.437	1.40	270	251	255	53			112	110	1.0	0.86	57.11	32.725	99.3	46.200
C-6	42.5	00:42:30	538.600	0.51	0.990	0.98	267	249	257	56			112	112	1.0	0.71	47.31	34.051	99.2	45.401
D-1	45.0	00:45:00	540.030	0.76	1.476	1.50	215	250	251	81			81	83	1.0	0.87	55.66	35.696	99.0	45.090
D-2	47.5	00:47:30	541.710	0.81	1.573	1.60	219	252	251	56			81	82	1.0	0.90	57.63	37.393	98.6	44.872
D-3	50.0	00:50:00	543.440	0.82	1.592	1.60	219	251	251	52			83	82	1.0	0.91	57.98	39.077	98.6	44.659
D-4	52.5	00:52:30	545.160	0.83	1.611	1.60	218	251	251	52			84	82	1.0	0.91	58.29	40.808	98.5	44.518
D-5	55.0	00:55:00	546.930	0.69	1.340	1.30	217	248	251	54			84	82	1.0	0.83	53.11	42.440	98.5	44.285
D-6	57.5	00:57:30	548.600	0.45	0.874	0.86	215	250	250	57			84	82	1.0	0.67	42.83	43.768	98.6	43.768
Last Pt	60.0	01:00:00	549.960																	
Final Val	60.0		549.960											**Max Vac**	2.0	**Final Values**		43.768	98.6	
Average Values				0.96		1.86	260	251	253	56			104	100		0.97	64.13			
													102							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/16/11
Sampling Location	Unit 3A	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data				
Run Number	Base-1	Base-2	Base-3	
Run Start Time	09:47	11:12	12:40	(hh:mm)
Run Stop Time	11:00	12:26	18:48	(hh:mm)
Train Prepared By	AS	AS	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/16/11	03/16/11	03/16/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/16/11	03/16/11	03/16/11	(mm/dd/yy)
Relinquished Time	11:00	12:26	18:48	(hh:mm)

Equipment Identification Numbers			
Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Weight					
Final Weight	(W_f)	2150.1	2166.5	2159.3	g
Initial Weight	(W_i)	2065.6	2080.6	2075.7	g
Net Weight	(W_n)	84.5	85.9	83.6	g
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W_f)	806.1	880.9	848.8	g
Initial Weight	(W_i)	798.3	870.2	835.9	g
Net Weight	(W_n)	7.8	10.7	12.9	g
Comments					
Total Water Collected					
Total Weight	(W_{lc})	92.3	96.6	96.5	g
Total Volume	(V_{lc})	92.5	96.8	96.7	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Run Start Time	09:47	11:12	12:40		hh:mm
Run Stop Time	11:00	12:26	18:48		hh:mm
Test Date	03/16/11	03/16/11	03/16/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Initial Meter Volume	408.820	455.640	503.610		ft^3
Final Meter Volume	455.370	503.310	549.960		ft^3
Total Meter Volume	46.550	47.670	46.350	46.857	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	110.42	108.58	102.25	107.08	°F
Average Stack Temperature	273.92	275.21	260.38	269.83	°F
Barometric Pressure	30.25	30.24	30.25	30.25	in Hg
Stack Static Pressure	0.81	0.81	0.81	0.81	in H_2O
Absolute Stack Pressure	30.31	30.30	30.31	30.31	in Hg
Average Orifice Pressure Drop	1.85	1.91	1.86	1.87	in H_2O
Absolute Meter Pressure	30.38	30.37	30.38	30.37	in Hg
Avg Square Root Pitot Pressure	1.00	0.99	0.97	0.99	$\sqrt{(in\ H_2O)}$
Moisture Content Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Impinger Water Weight Gain	84.50	85.90	83.60	84.67	g
Silica Gel Weight Gain	7.80	10.70	12.90	10.47	g
Total Water Volume Collected	92.47	96.77	96.67	95.30	ml
Standard Water Vapor Volume	4.35	4.55	4.55	4.49	scf
Standard Meter Volume	43.4	44.5	43.8	43.9	dscf
Calculated Stack Moisture	9.12	9.28	9.41	9.27	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	9.12	9.28	9.41	9.27	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Carbon Dioxide Content	4.4	4.4	4.4	4.4	%
Oxygen Content	13.1	13.1	13.2	13.1	%
Carbon Monoxide Content	0.9	0.9	0.7	0.8	ppm
Nitrogen Content	82.5	82.5	82.4	82.4	%
Stack Dry Molecular Weight	29.23	29.23	29.24	29.23	lb/lb-mole
Stack Wet Molecular Weight	28.21	28.19	28.18	28.19	lb/lb-mole
Calculated Fuel Factor	1.763	1.765	1.740	1.756	
Fuel F-Factor	8641.06	8641.06	8641.06	8641.06	dscf/MMBtu
Percent Excess Air	150.7	151.0	154.8	152.2	%
Volumetric Flow Rate Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Average Stack Gas Velocity	66.25	65.99	64.13	65.45	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,503,860	1,498,040	1,455,700	1,485,866	acfm
Wet Standard Stack Flow Rate	65,760	65,369	64,851	65,327	wkscfh
Dry Standard Stack Flow Rate	59,762,784	59,305,153	58,749,141	59,272,359	dscfh
Percent of Isokinetic Rate	95.7	99.5	98.6	97.9	%
Ammonia Analysis (CTM-027)	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3A-R1-FH	U3A-R2-FH	U3A-R3-FH		
Lab Log Number (Back Half)	U3A-R1-BH	U3A-R2-BH	U3A-R3-BH		
Front Half Results (C_f)	4.5710	4.9540	6.5340	5.3530	mg/l
Back Half Results (C_b)	0.0760	0.1570	0.1230	0.1187	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	200	210	200	203	ml
Back Half Sample Volume	180	200	170	183	ml
Volume of NH_3	0.00122	0.00141	0.00175	0.00146	L
NH_3 Concentration	0.99	1.12	1.41	1.17	ppmvd
NH_3 Concentration	0.75	0.85	1.08	0.89	ppm@15%O_2

TEST RESULTS

NH_3 Emissions
Base Load with Duct Burners

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3A
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/16/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3A	
Base Run Number		Base wDB	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

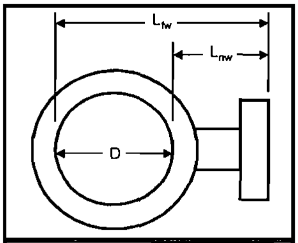
Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	03/17/11	03/17/11	03/17/11	
Load	% or w/DB	Base wDB	Base wDB	Base wDB	
Fuel F-Factor		8680.89	8680.89	8680.89	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	($\Delta H_@$)	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

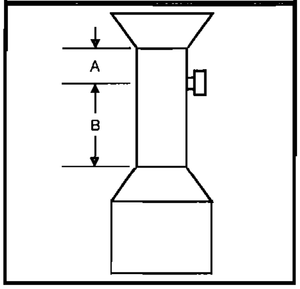
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/16/11
Sampling Location	Unit 3A	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²





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[1] 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

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

● Method 1 Trav ○ 12 Point PM Trav ○ Velocit

Location of Traverse Points in Circular Stacks									
Traverse	(Fraction of Stack Diameter from Inside Wall to Traverse Point)								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center			
Sampling Location	Unit 3A			
Operator	TG			
Project #	bv-10-westcounty.fl-comp#2			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/16/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft^2
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.90	%vd
Oxygen Concentration	(%O_2)	12.40	%vd
Carbon Monoxide Concentration	(ppmCO)	0.76	ppmvd
Nitrogen Concentration	(%N_2)	82.70	%vd
Stack Moisture Content	(B_{ws})	10.06	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.15	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	66.31	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	59,199,428	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	986,657	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,505,248	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	65,821,023	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):
If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number	Base wDB-V1			
Run Time	07:45	**Start**	08:15	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(i)}$)
	in H_2O	deg	°F	ft/sec
A-1	0.88	0	276	62.57
A-2	0.91	0	277	63.67
A-3	0.91	0	277	63.67
A-4	0.90	0	276	63.28
A-5	0.80	0	275	59.62
A-6	0.50	0	269	46.94
B-1	0.81	0	274	59.95
B-2	0.85	0	270	61.25
B-3	0.85	0	269	61.20
B-4	0.82	0	269	60.11
B-5	0.68	0	269	54.74
B-6	0.50	0	266	46.84
C-1	0.94	0	276	64.67
C-2	1.30	0	275	76.00
C-3	1.30	0	273	75.90
C-4	1.40	0	272	78.71
C-5	1.40	0	271	78.65
C-6	1.10	0	267	69.53
D-1	1.00	0	284	67.06
D-2	1.20	0	280	73.27
D-3	1.30	0	280	76.26
D-4	1.30	0	279	76.21
D-5	1.50	0	278	81.80
D-6	1.10	0	272	69.77
Average	1.01	0	274	
	1.00	**= Square roots of Δp**		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/17/11		
Sampling Location	Unit 3A	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data

Run Number	Base wDB-1		**Run Start Time**		10:06	**Run Stop Time**	11:18	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:12	4.9	12.5	0.8	82.6	29.28	1.717	133.5	YES

Gas Analysis Data

Run Number	Base wDB-2		**Run Start Time**		11:30	**Run Stop Time**	12:42	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:12	4.9	12.4	0.7	82.7	29.28	1.743	130.3	YES

Gas Analysis Data

Run Number	Base wDB-3		**Run Start Time**		12:56	**Run Stop Time**	14:07	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:11	4.9	12.4	0.8	82.8	29.28	1.748	130.0	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/17/11
Sampling Location	Unit 3A	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data									
Run Number		Base wDB-1		**Run Start Time**		10:06	**Run Stop Time**		11:18
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.110	dcf	**Barometric Pressure**		(P_b)	30.27	in Hg
Average Stack Temp		$(t_s)_{avg}$	222	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	93	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.75	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	815.60	779.50	613.90	836.30				
Initial Value	$(V_i),(W_i)$	746.70	758.20	608.90	823.40				
Net Value	$(V_n),(W_n)$	68.9	21.3	5.0	12.9				
Results									
Total Weight		(W_t)	108.10	g	**Water Vol Weighed**		($V_{wsg(std)}$)	5.097	scf
Std Meter Volume		($V_{m(std)}$)	45.283	dscf	**Sat. Moisture Content**		($B_{ws(svp)}$)	100.00	%
Calc Moisture Content		($B_{ws(calc)}$)	10.12	%	**Final Moisture Content**		(B_{ws})	10.12	%

Moisture Content Data									
Run Number		Base wDB-2		**Run Start Time**		11:30	**Run Stop Time**		12:42
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	46.500	dcf	**Barometric Pressure**		(P_b)	30.27	in Hg
Average Stack Temp		$(t_s)_{avg}$	225	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	92	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.90	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	839.20	804.50	623.10	864.80				
Initial Value	$(V_i),(W_i)$	772.50	783.20	616.00	852.80				
Net Value	$(V_n),(W_n)$	66.7	21.3	7.1	12.0				
Results									
Total Weight		(W_t)	107.10	g	**Water Vol Weighed**		($V_{wsg(std)}$)	5.050	scf
Std Meter Volume		($V_{m(std)}$)	44.782	dscf	**Sat. Moisture Content**		($B_{ws(svp)}$)	100.00	%
Calc Moisture Content		($B_{ws(calc)}$)	10.13	%	**Final Moisture Content**		(B_{ws})	10.13	%

Moisture Content Data									
Run Number		Base wDB-3		**Run Start Time**		12:56	**Run Stop Time**		14:07
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	45.970	dcf	**Barometric Pressure**		(P_b)	30.25	in Hg
Average Stack Temp		$(t_s)_{avg}$	220	°F	**Stack Static Pressure**		(P_{static})	0.81	in H_2O
Average Meter Temp		$(t_m)_{avg}$	90	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.85	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	819.30	750.10	614.40	839.50				
Initial Value	$(V_i),(W_i)$	744.70	734.00	610.00	830.60				
Net Value	$(V_n),(W_n)$	74.6	16.1	4.4	8.9				
Results									
Total Weight		(W_t)	104.00	g	**Water Vol Weighed**		($V_{wsg(std)}$)	4.904	scf
Std Meter Volume		($V_{m(std)}$)	44.444	dscf	**Sat. Moisture Content**		($B_{ws(svp)}$)	100.00	%
Calc Moisture Content		($B_{ws(calc)}$)	9.94	%	**Final Moisture Content**		(B_{ws})	9.94	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/17/11
Operator	TG
Run Number	Base wDB-1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	222.4	°F
Average Meter Temp	(t_m)	93.1	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	0.97	in H_2O
Stack Moisture Content	(B_{ws})	10.12	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.99	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	5.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2118	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	Inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.27	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.33	in Hg
Absolute Meter Pressure	(P_m)	30.40	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	10:06	**End**	11:18

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	746.7	758.2	608.9	823.4				
Post	815.6	779.5	613.9	836.3				

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH_d)	Actual Orifice ΔH (ΔH_a)	Stack Temp (t_s)	Probe Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (≤68°F)	Cond. Temp (≤–°F)	CPM Filter Temp (–±–°F)	Meter Inlet Temp (t_{mi})	Meter Outlet Temp (t_{mo})	Pump Vacuum	Square Root ΔP ($\Delta p^{1/2}$)	Local Stack Velocity ($(v_s)_i$)	Cumul. Meter Volume ($(V_m)_{std}$)	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume ($(V_m)_{std}$)
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	565.650	0.81	1.612	1.50	237	254	266	68			91	87	1.0	0.90	58.40	1.703	97.7	40.878
A-2	2.5	00:02:30	567.410	0.89	1.772	1.60	238	251	268	65			96	88	2.0	0.94	61.26	3.561	99.8	42.736
A-3	5.0	00:05:00	569.340	0.86	1.712	1.60	237	250	267	63			97	89	2.0	0.93	60.18	5.416	101.0	43.328
A-4	7.5	00:07:30	571.270	0.82	1.632	1.50	236	254	264	63			96	89	2.0	0.91	58.72	7.157	100.5	42.939
A-5	10.0	00:10:00	573.080	0.70	1.393	1.30	235	250	283	63			99	89	2.0	0.84	54.22	8.844	101.2	42.449
A-6	12.5	00:12:30	574.840	0.80	1.194	1.10	232	251	261	65			101	90	2.0	0.77	50.08	10.583	103.5	42.331
B-1	15.0	00:15:00	578.660	0.65	1.294	1.20	220	254	283	64			96	92	1.0	0.81	51.68	12.126	102.8	41.573
B-2	17.5	00:17:30	578.270	0.83	1.652	1.50	220	251	264	63			96	92	1.0	0.91	58.39	13.756	101.4	41.268
B-3	20.0	00:20:00	579.970	0.79	1.573	1.40	217	250	264	64			97	92	1.0	0.89	56.84	15.317	100.2	40.846
B-4	22.5	00:22:30	581.600	0.76	1.513	1.40	213	253	265	65			96	93	1.0	0.87	55.59	16.946	99.7	40.670
B-5	25.0	00:25:00	583.300	0.74	1.473	1.40	211	254	264	66			96	92	1.0	0.86	54.77	18.604	99.5	40.592
B-6	27.5	00:27:30	585.030	0.49	0.975	0.90	207	250	264	67			95	93	1.0	0.70	44.44	19.945	99.3	39.890
C-1	30.0	00:30:00	586.430	1.00	1.991	1.80	215	254	264	68			95	91	2.0	1.00	63.86	21.820	98.9	40.283
C-2	32.5	00:32:30	588.380	1.20	2.389	2.20	214	254	266	68			98	93	2.0	1.10	69.90	23.822	98.4	40.838
C-3	35.0	00:35:00	590.470	1.20	2.389	2.20	212	255	251	64			96	93	2.0	1.10	69.80	25.895	98.2	41.433
C-4	37.5	00:37:30	592.630	1.30	2.588	2.40	213	253	254	62			96	93	3.0	1.14	72.70	28.094	98.2	42.142
C-5	40.0	00:40:00	594.920	1.30	2.588	2.40	211	250	252	62			95	93	3.0	1.14	72.60	30.383	98.4	42.865
C-6	42.5	00:42:30	597.280	1.10	2.190	2.00	209	251	249	63			94	92	3.0	1.05	66.68	32.527	98.8	43.369
D-1	45.0	00:45:00	599.530	0.93	1.851	1.70	224	252	251	68			92	90	2.0	0.96	61.99	34.543	99.3	43.633
D-2	47.5	00:47:30	601.620	1.10	2.190	2.00	228	254	252	63			93	90	3.0	1.05	67.62	36.791	99.9	44.149
D-3	50.0	00:50:00	603.950	1.20	2.389	2.20	229	254	254	62			93	90	3.0	1.10	70.68	39.078	100.3	44.660
D-4	52.5	00:52:30	608.320	1.20	2.389	2.20	227	252	251	62			93	90	2.0	1.10	70.57	41.201	100.3	44.946
D-5	55.0	00:55:00	608.520	1.20	2.389	2.20	228	255	250	63			93	89	2.0	1.10	70.63	43.229	100.0	45.108
D-6	57.5	00:57:30	610.620	1.20	2.389	2.20	224	254	251	85			93	90	2.0	1.10	70.42	45.294	99.9	45.294
Last Pt	60.0	01:00:00	612.760																	
Final Val	60.0	01:00:00	612.760											Max Vac	3.0	Final Values		45.294	99.9	
Average Values				0.95		1.75	222	253	259	64			95	91		0.97	62.17			
													93							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/17/11
Operator	TG
Run Number	Base wDB-2

Filter #
1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	225.3	°F
Average Meter Temp	(t_m)	92.2	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.96	in H_2O
Stack Moisture Content	(B_{ws})	10.13	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.98	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
	Pre (-)	4.0	in H_2O for	15.0	sec
PASS	**Post (+)**	5.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2132	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Pressures			
Barometric Pressure	(P_b)	30.27	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.33	in Hg
Absolute Meter Pressure	(P_m)	30.40	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	11:30	**End**	12:42

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	772.5	783.2	616.0	852.8				
Post	839.2	804.5	623.1	864.8				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**: Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_i$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	612.980	1.00	1.979	2.00	226	254	250	68			90	87	3.0	1.00	64.39	2.085	106.8	50.042
A-2	2.5	00:02:30	615.130	1.00	1.979	2.00	227	251	252	64			93	87	2.0	1.00	64.43	4.029	103.3	48.349
A-3	5.0	00:05:00	617.140	1.20	2.374	2.40	232	253	249	61			93	87	2.0	1.10	70.84	6.314	104.8	50.510
A-4	7.5	00:07:30	619.500	1.40	2.770	2.80	230	252	251	62			91	88	2.0	1.18	76.41	8.157	99.2	48.940
A-5	10.0	00:10:00	621.400	1.40	2.770	2.80	230	255	249	63			90	88	3.0	1.18	76.41	10.419	99.0	50.009
A-6	12.5	00:12:30	623.730	1.10	2.176	2.20	227	252	252	63			92	87	2.0	1.05	67.58	12.472	99.2	49.887
B-1	15.0	00:15:00	625.850	0.92	1.820	1.90	224	255	249	68			90	88	2.0	0.96	61.87	14.361	99.4	49.237
B-2	17.5	00:17:30	627.800	1.10	2.176	2.20	224	258	253	67			92	88	2.0	1.05	67.43	16.364	99.2	49.091
B-3	20.0	00:20:00	629.870	1.20	2.374	2.40	220	254	252	67			95	89	2.0	1.10	70.22	18.389	98.6	49.039
B-4	22.5	00:22:30	631.970	1.20	2.374	2.40	220	256	252	67			96	89	2.0	1.10	70.22	20.519	98.7	49.246
B-5	25.0	00:25:00	634.180	1.30	2.572	2.60	219	254	251	65			96	89	3.0	1.14	73.04	22.727	98.7	49.587
B-6	27.5	00:27:30	636.470	1.20	2.374	2.40	217	252	253	60			99	90	3.0	1.10	70.07	25.272	100.6	50.544
C-1	30.0	00:30:00	639.120	0.65	1.286	1.30	223	255	254	64			96	92	1.0	0.81	51.80	26.691	100.1	49.275
C-2	32.5	00:32:30	640.600	0.78	1.543	1.60	222	254	252	58			98	92	1.0	0.88	56.70	28.510	100.4	48.874
C-3	35.0	00:35:00	642.500	0.74	1.464	1.50	217	252	252	53			99	92	1.0	0.86	55.02	29.973	99.7	47.957
C-4	37.5	00:37:30	644.030	0.70	1.385	1.40	217	256	252	51			100	92	1.0	0.84	53.52	31.597	99.7	47.396
C-5	40.0	00:40:00	645.730	0.70	1.385	1.40	216	252	253	51			101	93	1.0	0.84	53.48	33.257	99.7	46.950
C-6	42.5	00:42:30	647.470	0.47	0.930	0.95	215	252	253	52			95	93	1.0	0.69	43.79	34.617	99.8	46.155
D-1	45.0	00:45:00	648.890	0.75	1.484	1.50	234	254	256	68			92	92	2.0	0.87	56.08	36.282	99.7.	45.830
D-2	47.5	00:47:30	650.620	0.88	1.741	1.80	235	254	253	64			95	92	2.0	0.94	60.80	38.107	99.8	45.728
D-3	50.0	00:50:00	652.520	0.84	1.662	1.70	234	251	254	62			93	92	2.0	0.92	59.35	39.867	99.7	45.563
D-4	52.5	00:52:30	654.350	0.83	1.642	1.70	233	252	253	62			92	91	2.0	0.91	58.96	41.631	99.7	45.416
D-5	55.0	00:55:00	656.180	0.74	1.464	1.50	233	251	254	62			94	90	2.0	0.86	55.67	43.287	99.7	45.169
D-6	57.5	00:57:30	657.900	0.53	1.049	1.10	231	251	252	64			95	91	1.0	0.73	47.04	44.803	100.0	44.803
Last Pt	60.0	01:00:00	659.480																	
Final Val	60.0	01:00:00	659.480											Max Vac	3.0	Final Values		44.803	100.0	
Average Values				0.94		1.90	225	253	252	62			94	90		0.96	61.87			
													92							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Date	03/17/11
Operator	TG
Run Number	Base wDB-3

Filter #
1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	220.3	°F
Average Meter Temp	(t_m)	89.6	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.95	in H_2O
Stack Moisture Content	(B_{ws})	9.94	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Estimated Orifice Flow Rate	(O_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.99	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
	Pre (-)	4.0	in H_2O for	15.0	sec
PASS	**Post (+)**	5.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2127	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Stack Static Pressure	(P_{static})	0.81	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg
Absolute Meter Pressure	(P_m)	30.38	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	12:56	**End**	14:07

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	744.7	734.0	610.0	830.6				
Post	819.3	750.1	614.4	839.5				

Wash Volumes					
					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity ($(v_s)_i$)**	**Cumul. Meter Volume ($(V_m)_{std}$)**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume ($(V_m)_{std}$)**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	659.610	0.98	1.951	2.00	229	251	248	68			89	89	3.0	0.99	63.88	2.024	104.8	48.569
A-2	2.5	00:02:30	661.700	1.10	2.190	2.20	232	254	249	61			90	89	2.0	1.05	67.82	4.037	101.7	48.443
A-3	5.0	00:05:00	663.780	1.30	2.588	2.60	229	254	250	57			91	89	3.0	1.14	73.57	6.137	99.2	49.099
A-4	7.5	00:07:30	665.950	1.30	2.588	2.60	229	252	252	56			93	88	3.0	1.14	73.57	8.342	99.2	50.053
A-5	10.0	00:10:00	668.230	1.30	2.588	2.60	227	252	252	56			96	89	3.0	1.14	73.46	1D.905	102.9	52.345
A-6	12.5	00:12:30	670.890	1.10	2.190	2.20	225	255	249	58			95	89	3.0	1.05	67.48	12.813	101.4	51.252
B-1	15.0	00:15:00	672.870	0.86	1.712	1.70	220	254	254	65			89	89	1.0	0.93	59.45	14.680	101.6	50.333
B-2	17.5	00:17:30	674.800	1.10	2.190	2.20	218	257	255	63			90	89	2.0	1.05	67.13	16.587	100.5	49.761
B-3	20.0	00:20:00	676.770	1.20	2.389	2.40	214	251	244	62			91	89	2.0	1.10	69.91	18.677	100.1	49.805
B-4	22.5	00:22:30	678.930	1.30	2.588	2.60	213	254	254	62			90	88	3.0	1.14	72.71	20.888	99.9	50.131
B-5	25.0	00:25:00	681.210	1.30	2.588	2.60	211	252	252	64			90	87	3.0	1.14	72.60	23.110	99.8	50.423
B-6	27.5	00:27:30	683.500	1.10	2.190	2.20	209	254	254	64			93	88	2.0	1.05	66.69	25.159	99.7	50.317
C-1	30.0	00:30:00	685.620	0.55	1.095	1.10	210	252	254	68			88	87	1.0	0.74	47.19	26.689	99.9	49.273
C-2	32.5	00:32:30	687.200	0.77	1.533	1.50	216	252	254	64			91	87	1.0	0.88	56.08	28.333	99.7	46.572
C-3	35.0	00:35:00	888.900	0.79	1.573	1.60	213	247	255	59			92	88	1.0	0.89	56.68	30.004	99.4	48.006
C-4	37.5	00:37:30	690.630	0.75	1.493	1.50	211	247	253	57			92	88	1.0	0.87	55.15	31.693	99.4	47.540
C-5	40.0	00:40:00	692.380	0.68	1.354	1.40	210	247	252	56			92	88	1.0	0.82	52.47	33.353	99.5	47.087
C-6	42.5	00:42:30	694.100	0.47	0.936	0.94	208	251	256	55			95	88	1.0	0.69	43.56	34.709	99.5	46.279
D-1	45.0	00:45:00	695.510	0.59	1.175	1.20	221	252	255	61			92	89	1.0	0.77	49.27	36.270	99.7	45.815
D-2	47.5	00:47:30	697.130	0.88	1.752	1.80	231	250	254	55			91	89	2.0	0.94	60.62	38.077	99.6	45.692
D-3	50.0	00:50:00	699.000	0.84	1.672	1.60	230	252	256	53			89	89	2.0	0.92	59.18	39.779	99.4	45.462
D-4	52.5	00:52:30	700.760	0.82	1.632	1.60	229	252	255	55			89	87	2.0	0.91	58.43	41.466	99.3	45.235
D-5	55.0	00:55:00	702.500	0.71	1.413	1.40	229	252	254	56			89	87	2.0	0.84	54.37	43.112	99.3	44.987
D-6	57.5	00:57:30	704.200	0.44	0.876	0.88	223	252	251	56			89	87	1.0	0.66	42.61	44.447	99.4	44.447
Last Pt	60.0	01:00:00	705.580																	
Final Val	60.0		705.580											**Max Vac**	3.0	**Final Values**		44.447	99.4	
Average Values				0.93		1.85	220	252	253	60			91	88		0.95	61.00			
													90							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/17/11
Sampling Location	Unit 3A	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data				
Run Number	Base wDB-1	Base wDB-2	Base wDB-3	
Run Start Time	10:06	11:30	12:56	(hh:mm)
Run Stop Time	11:18	12:42	14:07	(hh:mm)
Train Prepared By	AS	AS	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/17/11	03/17/11	03/17/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/17/11	03/17/11	03/17/11	(mm/dd/yy)
Relinquished Time	11:18	12:42	14:07	(hh:mm)

Equipment Identification Numbers			
Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Weight					
Final Weight	(W_f)	2209.0	2266.8	2183.8	g
Initial Weight	(W_i)	2113.8	2171.7	2088.7	g
Net Weight	(W_n)	95.2	95.1	95.1	g
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W_f)	836.3	864.8	839.5	g
Initial Weight	(W_i)	823.4	852.8	830.6	g
Net Weight	(W_n)	12.9	12.0	8.9	g
Comments					
Total Water Collected					
Total Weight	(W_{lc})	108.1	107.1	104.0	g
Total Volume	(V_{lc})	108.3	107.3	104.2	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Run Start Time	10:06	11:30	12:56		hh:mm
Run Stop Time	11:18	12:42	14:07		hh:mm
Test Date	03/17/11	03/17/11	03/17/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Initial Meter Volume	565.650	612.980	659.610		ft^3
Final Meter Volume	612.760	659.480	705.580		ft^3
Total Meter Volume	47.110	46.500	45.970	46.527	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	93.06	92.21	89.65	91.64	°F
Average Stack Temperature	222.38	225.25	220.29	222.64	°F
Barometric Pressure	30.27	30.27	30.25	30.26	in Hg
Stack Static Pressure	0.81	0.81	0.81	0.81	in H_2O
Absolute Stack Pressure	30.33	30.33	30.31	30.32	in Hg
Average Orifice Pressure Drop	1.75	1.90	1.85	1.83	in H_2O
Absolute Meter Pressure	30.40	30.40	30.38	30.39	in Hg
Avg Square Root Pitot Pressure	0.97	0.96	0.95	0.96	$\sqrt{(\text{in } H_2O)}$
Moisture Content Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Impinger Water Weight Gain	95.20	95.10	95.10	95.13	g
Silica Gel Weight Gain	12.90	12.00	8.90	11.27	g
Total Water Volume Collected	108.29	107.29	104.19	106.59	ml
Standard Water Vapor Volume	5.10	5.05	4.90	5.02	scf
Standard Meter Volume	45.3	44.8	44.4	44.8	dscf
Calculated Stack Moisture	10.12	10.13	9.94	10.06	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	10.12	10.13	9.94	10.06	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3A
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Carbon Dioxide Content	4.9	4.9	4.9	4.9	%
Oxygen Content	12.5	12.4	12.4	12.4	%
Carbon Monoxide Content	0.8	0.7	0.8	0.8	ppm
Nitrogen Content	82.6	82.7	82.8	82.7	%
Stack Dry Molecular Weight	29.28	29.28	29.28	29.28	lb/lb-mole
Stack Wet Molecular Weight	28.14	28.14	28.16	28.14	lb/lb-mole
Calculated Fuel Factor	1.717	1.743	1.748	1.736	
Fuel F-Factor	8680.89	8680.89	8680.89	8680.89	dscf/MMBtu
Percent Excess Air	133.5	130.3	130.0	131.3	%
Volumetric Flow Rate Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Average Stack Gas Velocity	62.17	61.87	61.00	61.68	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,411,271	1,404,527	1,384,648	1,400,149	acfm
Wet Standard Stack Flow Rate	66,417	65,822	65,320	65,853	wkscfh
Dry Standard Stack Flow Rate	59,697,319	59,151,827	58,829,392	59,226,179	dscfh
Percent of Isokinetic Rate	99.9	100.0	99.4	99.7	%
Ammonia Analysis (CTM-027)	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3A-R1DB-FH	U3A-R2DB-FH	U3A-R3DB-FH		
Lab Log Number (Back Half)	U3A-R1DB-BH	U3A-R2DB-BH	U3A-R3DB-BH		
Front Half Results (C_f)	6.1410	5.3990	5.9040	5.8147	mg/l
Back Half Results (C_b)	0.0770	0.0700	0.0760	0.0743	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	225	240	220	228	ml
Back Half Sample Volume	230	210	170	203	ml
Volume of NH_3	0.00184	0.00172	0.00173	0.00176	L
NH_3 Concentration	1.44	1.36	1.37	1.39	ppmvd
NH_3 Concentration	1.00	0.94	0.95	0.96	ppm@15%O_2

TEST RESULTS

Opacity
Base Load

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3A Base
Location: West County Energy Center
Date: March 16, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3A Base
Location: West County Energy Center
Date: March 16, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3A Base
Location: West County Energy Center
Date: March 16, 2011
Project #: bv-10-westcounty.fl-comp#2

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

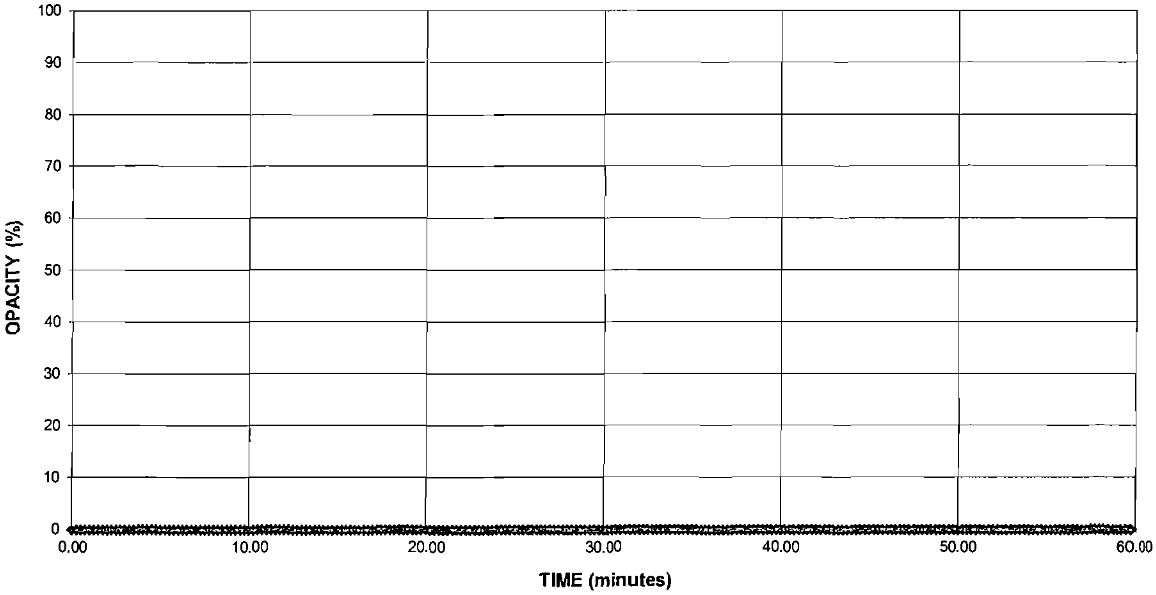
TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.	TIME (min)	OPACITY (%)	6 MIN AVG.
0.00	0	N/A	15.00	0	0.00	30.00	0	0.00	45.00	0	0.00
0.25	0	N/A	15.25	0	0.00	30.25	0	0.00	45.25	0	0.00
0.50	0	N/A	15.50	0	0.00	30.50	0	0.00	45.50	0	0.00
0.75	0	N/A	15.75	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 U3A Base
Location: West County Energy Center
Date: March 16, 2011
Project #: bv-10-westcounty.fl-comp#2

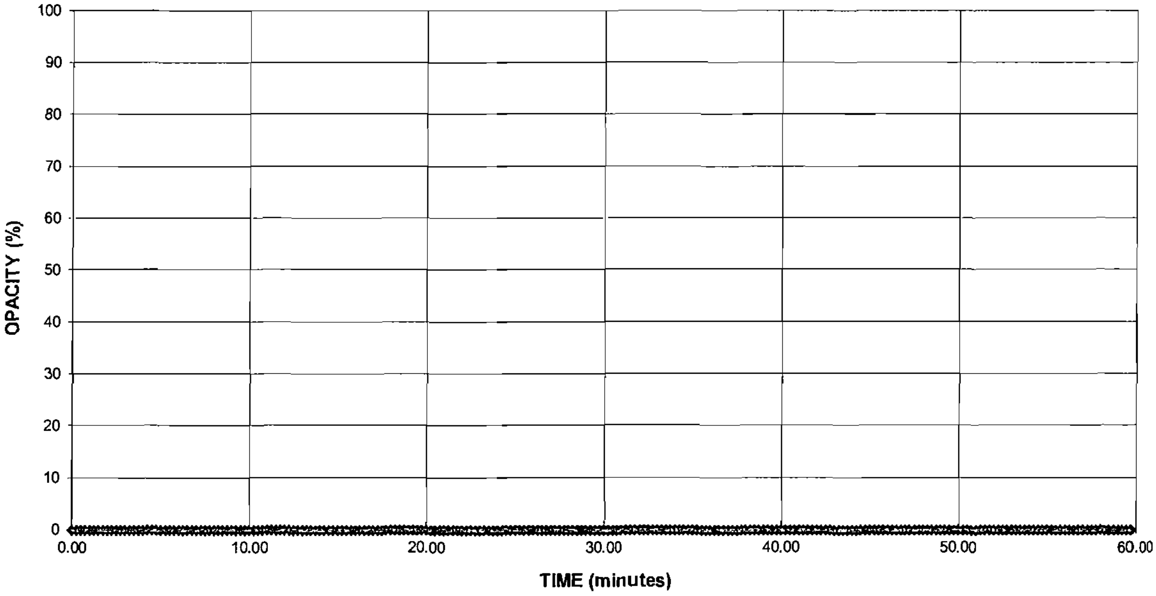
Run 1

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)



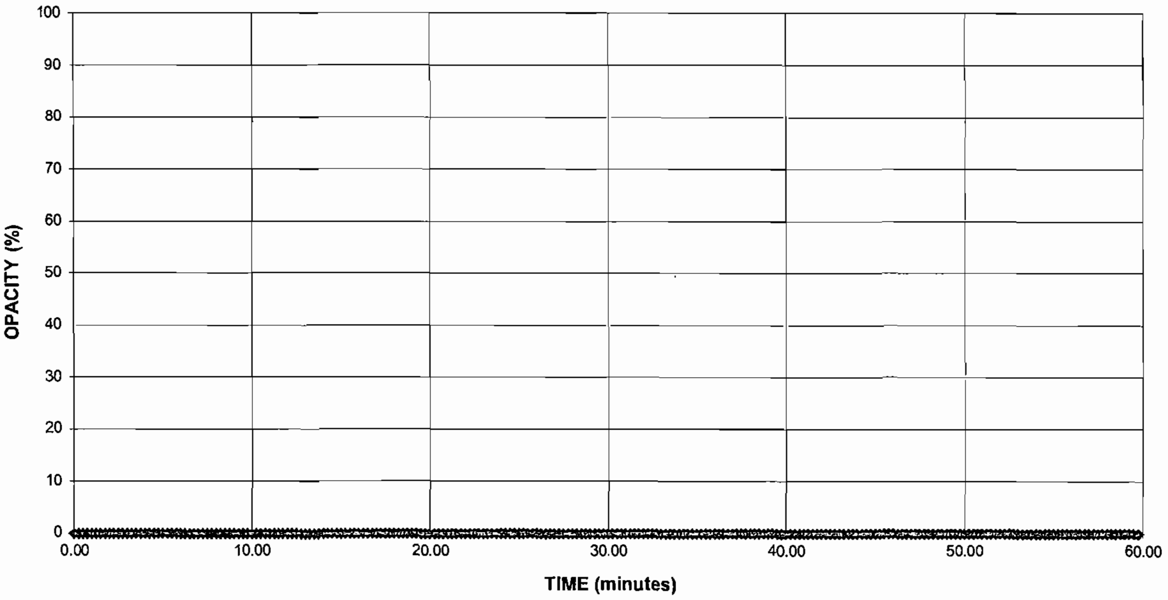
OPACITY RESULTS
(6 minute averages)



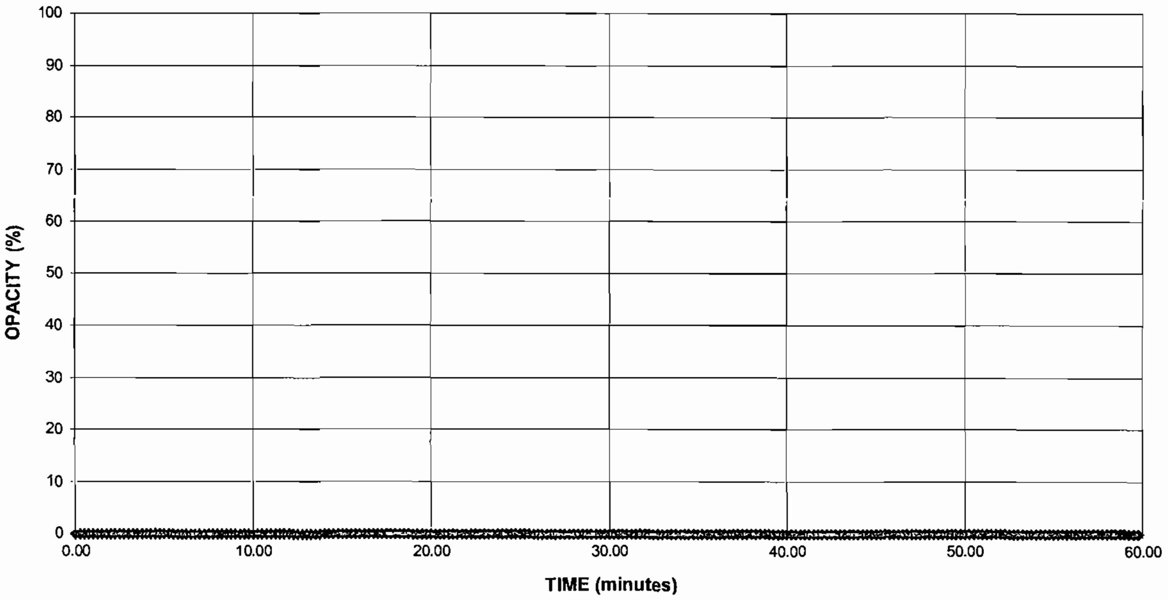
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit U3A Base
Location:	West County Energy Center
Date:	March 16, 2011
Project #:	bv-10-westcounty.fl-comp#2

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)



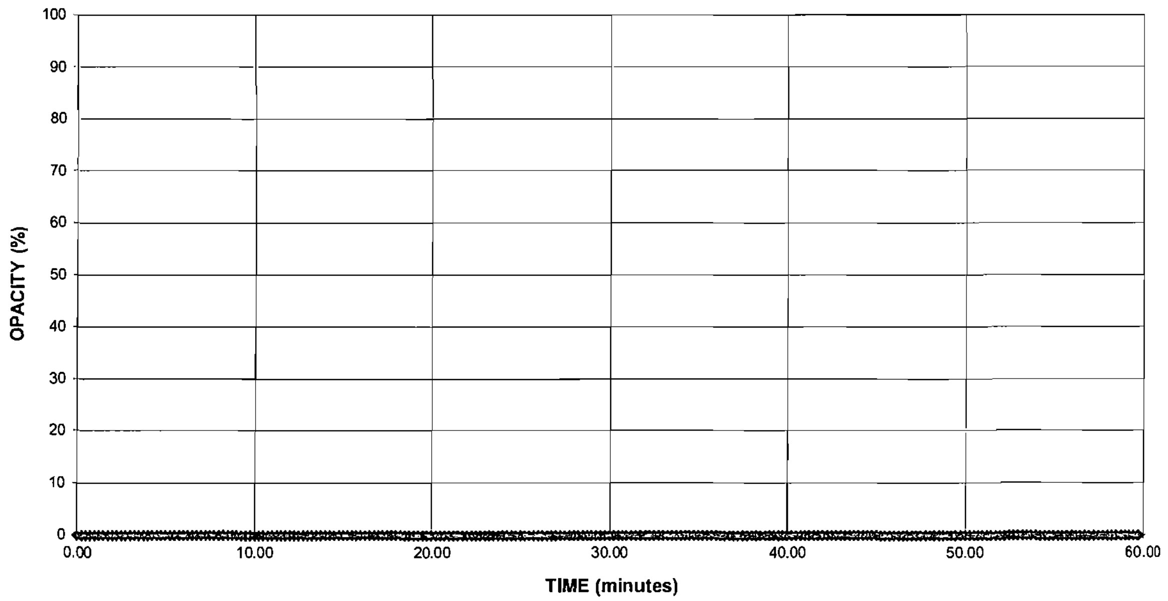
OPACITY RESULTS
(6 minute averages)



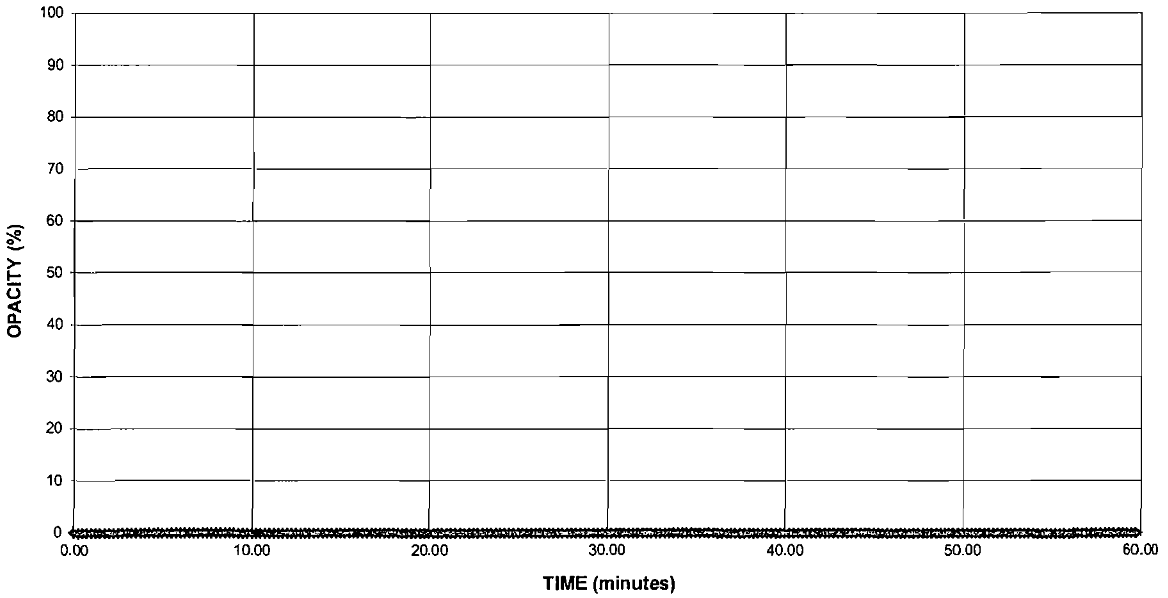
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit U3A Base
Location:	West County Energy Center
Date:	March 16, 2011
Project #:	bv-10-westcounty.fl-comp#2

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: ______

Company Name: FPL
Facility Name: West county Energy Center
Street Address: 20505 St Rd 80
City: Loxahatchee State: FL Zip: 33470

Process: NG Unit #: 3A Operating Mode: Base w/o DB
Control Equipment: HRSG Operating Mode: Base

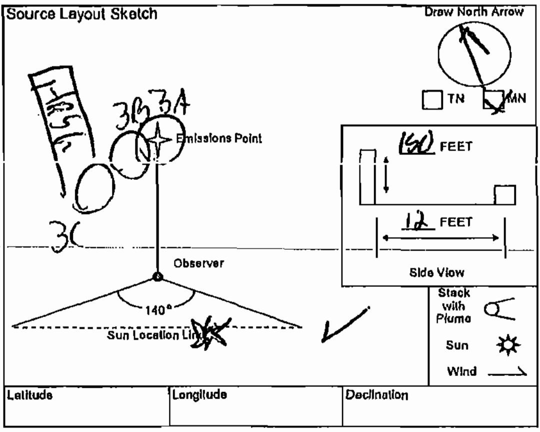
Describe Emissions Point: combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start: 150 ft End: 150 ft
Height of Emiss. Pt. Rel. to Observer Start: 150 ft End: 150 ft
Distance to Emiss. Pt. Start: 500 ft End: 500 ft
Direction to Emiss. Pt. (Degrees) Start: 6° End: 6°

Vetical Angle to Obs. Pt. Start: End:
Direction to Obs. Pt. (Degrees) Start: 186° End: 186°
Distance and Direction to Observation Point from Emission Point Start: 500 ft @ 186° End: 500 ft @ 186°

Describe Emissions Start: NV End: NV
Emission Color Start: NV End: NV
Water Droplet Plume Start: NONE End: NONE

Describe Plume Background Start: Sky End: Sky
Background Color Start: Blue/Gray End: Blue/Gray
Sky Conditions Start: Pt Cloudy End: Pt Cloudy
Wind Speed Start: 5-10 End: 5-10
Wind Direction Start: ESE End: ESE
Ambient Temp. Start: 74 End: 74
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude:
Longitude:
Declination:

Additional Information:

VISUAL EMISSIONS OBSERVATION FORM

Form Number: bv-10-westcounty-f1-3A-1
Page 1 of 6
Continued on Form Number: bv-10-westcounty-f1-
Observation Date: 16 Mar 11
Time Zone: Eastern
Start Time: 1107
End Time: 1206

Min. \ Sec.	0	15	30	45	Comments
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): Rob White
Observer's Signature: Date: 16-Mar-11
Organization: AHI
Certified By: ETA Date: 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base w/ DB
Control Equipment HRSG Operating Mode Base

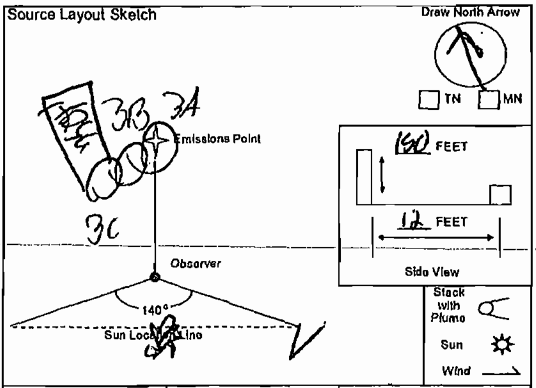
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 60 End 60

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue/gray End Blue/gray
Sky Conditions Start Pt Cloudy End Pt Cloudy
Wind Speed Start 5-10 End 5-10
Wind Direction Start ESE End ESE
Ambient Temp. Start 74 End 74
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3A-2 Page 2 of 6
Continued on Form Number bv-10-westcounty-f1-3A-1
Observation Date 16 Mar 11 Time Zone Eastern Start Time 1107 End Time 1206

Sec. / Min.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 16 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

Describe Emissions Pont
combine cycle natural Gas Turbine with no visible Emissions

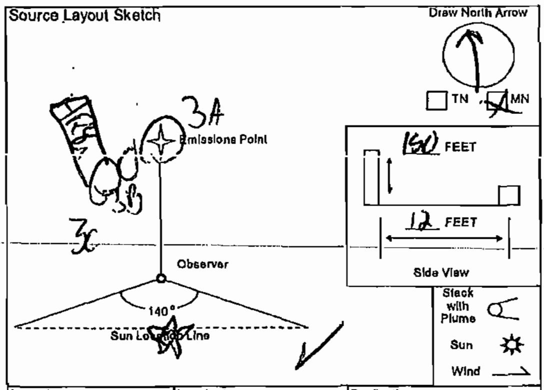
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 6° End 6°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 186° End 186°
Distance and Direction to Observation Point from Emission Point
Start 500 ft @ 186° End 500 ft @ 186°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blu/Gray End Blu/Gray
Sky Conditions Start Pt Cloudy End Pt Cloudy
Wind Speed Start 5-10 End 5-10
Wind Direction Start ESE End ESE
Ambient Temp. Start 74 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3A-3 Page 3 of 6
Continued on Form Number bv-10-westcounty-f1-3A-2
Observation Date 16 Mar-11 Time Zone Eastern Start Time 1010 End Time 1309

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 16 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base W/O DB
Control Equipment HRSG Operating Mode Base

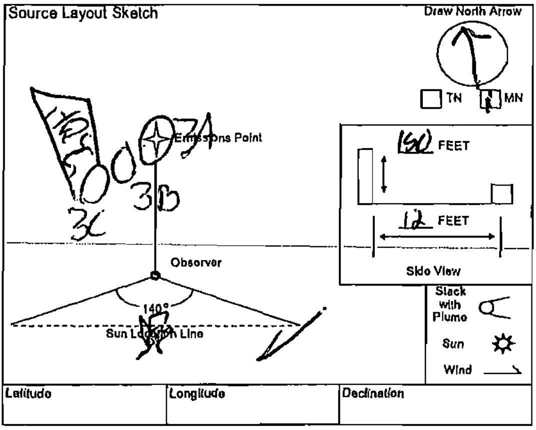
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 6° End 6°

Vertical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 186° End 186°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 186° End 500 ft @ 186°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue/Gray End Blue/Gray
Sky Conditions Start Pt Cldy End Pt Cldy
Wind Speed Start 5-10 End 5-10
Wind Direction Start ESE End ESE
Ambient Temp. Start 74 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty.f1-3A-4 Page 4 of 6
Continued on Form Number bv-10-westcounty.f1-3A-3
Observation Date 16 Mar 11 Time Zone Eastern Start Time 1310 End Time 1339

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 16 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One) [✓ Method 9] 203A 203B Other:

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-34-5 Page 5 of 6

Continued on Form Number bv-10-westcounty-f1-34-4

Observation Date 16-Mar-11 Time Zone Eastern Start Time 1315 End Time 1414

Company Name FPL

Facility Name West County Energy Center

Street Address 20505 St Rd 80

City Loxahatchee State FL Zip 33470

Process NG Unit # 34 Operating Mode Base 40 DB

Control Equipment HRSG Operating Mode Base

Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions

Height of Emiss. Pt. Start 150 ft End 150 ft

Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft

Distance to Emiss. Pt. Start 500 ft End 500 f

Direction to Emiss. Pt. (Degrees) Start 6° End 6°

Vertical Angle to Obs. Pt. Start End

Direction to Obs. Pt. (Degrees) Start 186° End 186°

Distance and Direction to Observation Point from Emission Point Start 500 ft @ 186° End ~~800~~ 500 ft @ 186°

Describe Emissions Start NV End NV

Emission Color Start NV End NV

Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky

Background Color Start Blue/Gray End Blue/Gray

Sky Conditions Start Pt Cloudy End Pt Cloudy

Wind Speed Start 5-10 End 5-10

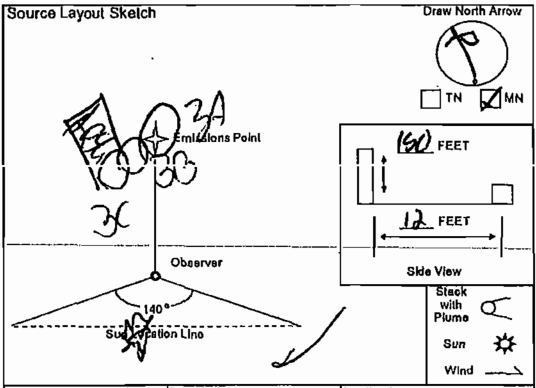
Wind Direction Start ESE End ESE

Ambient Temp. Start 81 End 80

Wet Bulb Temp.

RH Percent

Source Layout Sketch



Latitude

Longitude

Declination

Additional Information

Min. \ Sec.	0	15	30	45	Comments
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	
18	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) Rob White

Observer's Signature Date 16 Mar 11

Organization AHI

Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # Operating Mode
Control Equipment HRSG Operating Mode Base

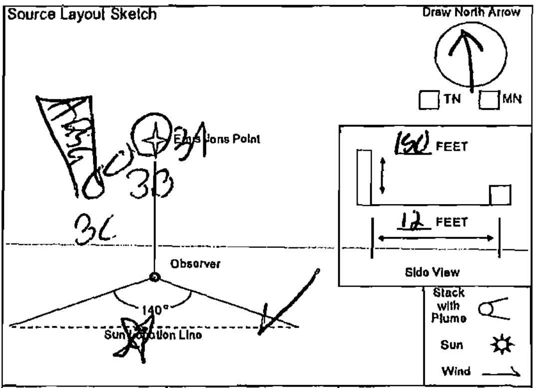
Describe Emissions Pont combine Cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start 6° End 6°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 86° End 86°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blu/Gry End Blu/Gry Sky Conditions Start Pt Cloudy End Pt Cloudy
Wind Speed Start 5-10 End 5-10 Wind Direction Start ESE End ESE
Ambient Temp. Start End Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3A-6 Page 6 of 6
Continued on Form Number bv-10-westcounty-f1 3A-5
Observation Date 16 Mar 11 Time Zone Eastern Start Time 1315 End Time 1414

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 16 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

TEST RESULTS

Opacity
Base Load with Duct Burners

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3A Base wDB
Location: West County Energy Center
Date: March 17, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3A Base wDB
Location: West County Energy Center
Date: March 17, 2011
Project #: bv-10-westcounty.fl-comp#2

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 3A Base wDB
Location: West County Energy Center
Date: March 17, 2011
Project #: bv-10-westcounty.fl-comp#2

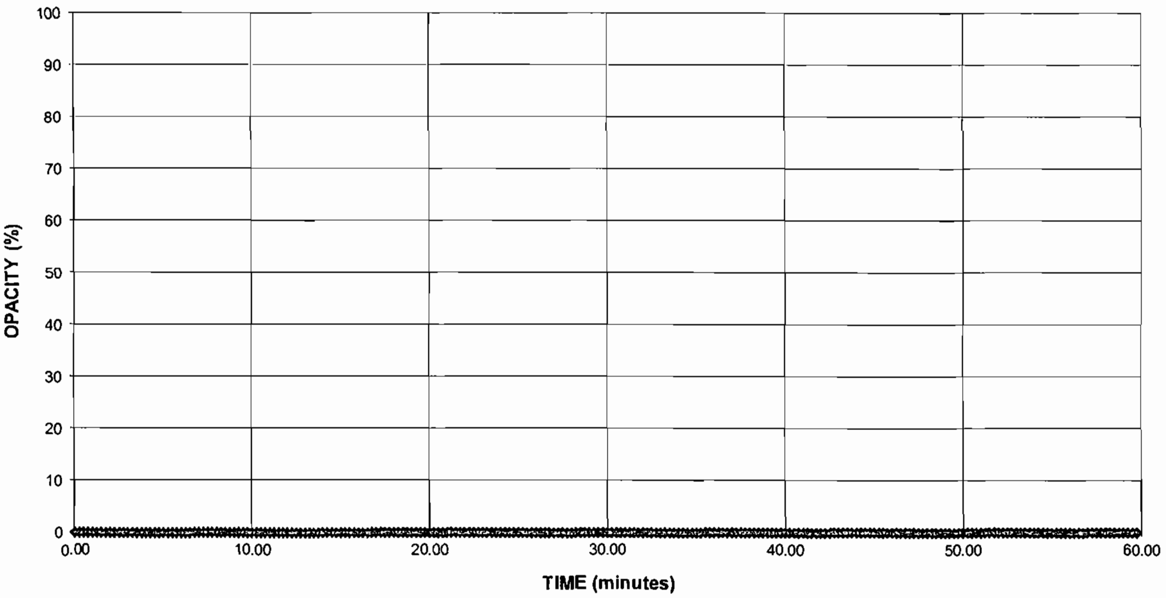
Run 3	**Average Opacity:**	0.00 %
	Maximum Opacity:	0 %
	6 Minute Average:	0.00 %
	6 Minute Maximum:	0.00 %
	Max Time w/ Opacity:	0.00 minutes

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

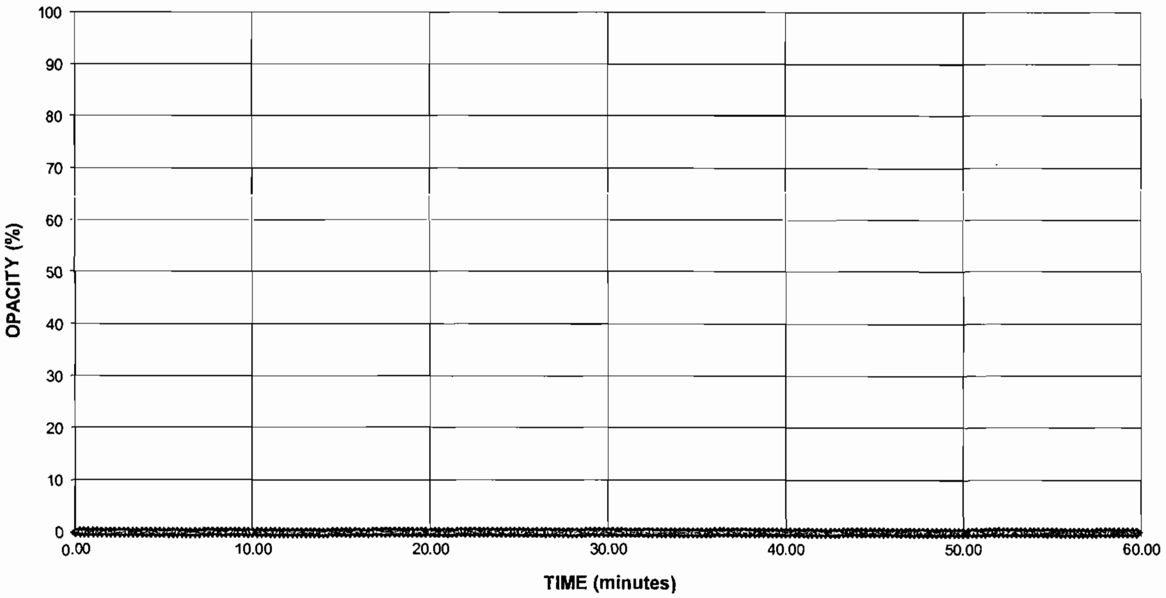
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit 3A Base wDB
Location:	West County Energy Center
Date:	March 17, 2011
Project #:	bv-10-westcounty.fl-comp#2

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)



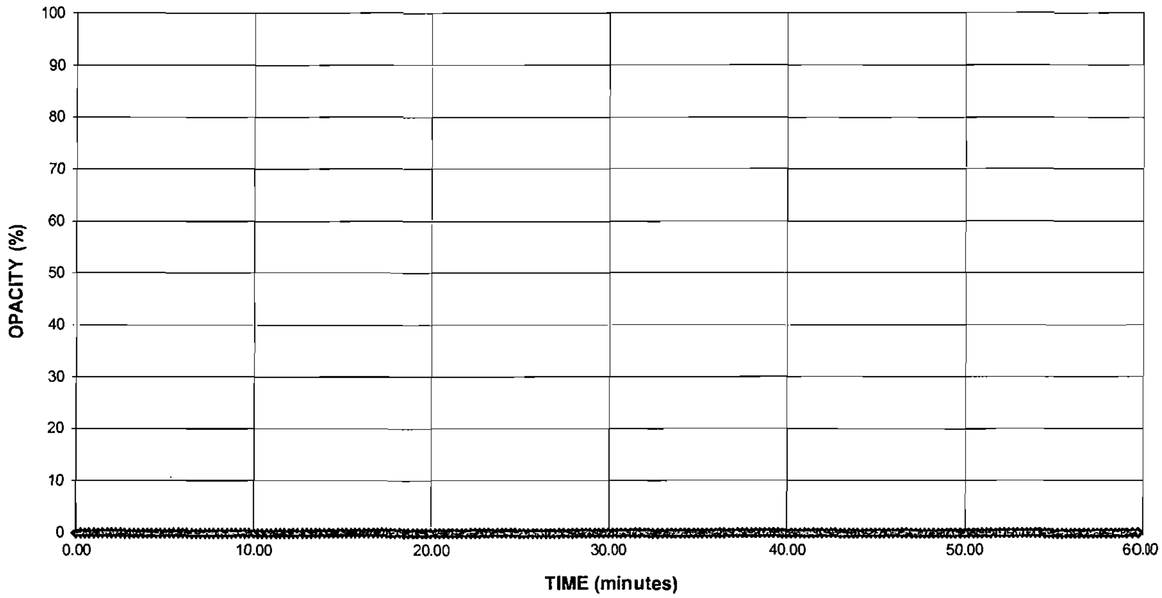
OPACITY RESULTS
(6 minute averages)



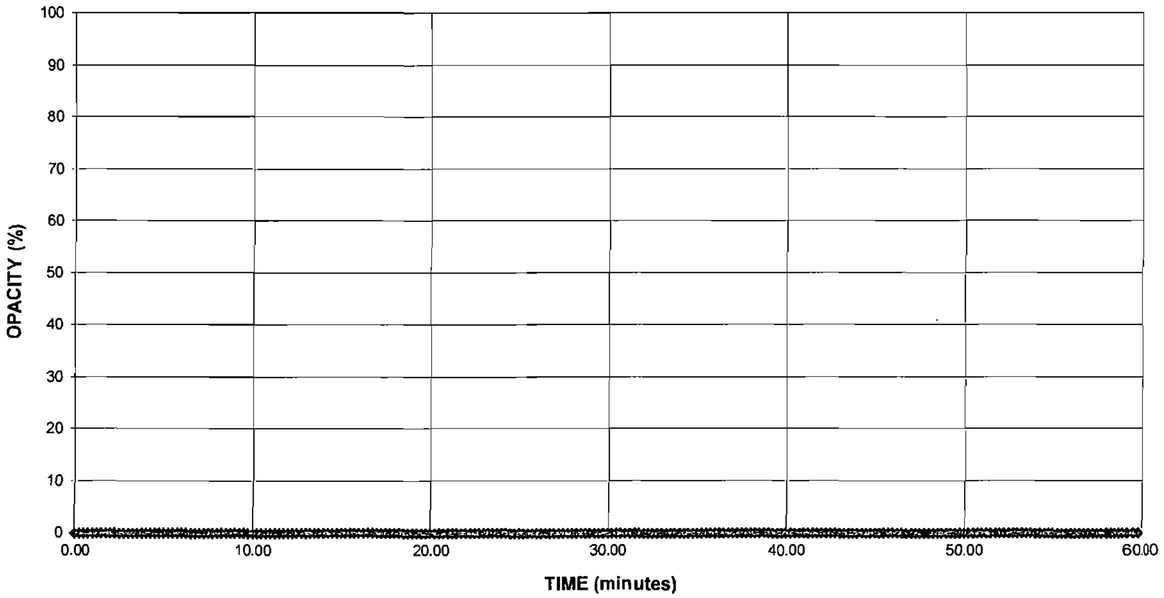
Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3A Base wDB
Location: West County Energy Center
Date: March 17, 2011
Project #: bv-10-westcounty.fl-comp#2

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)



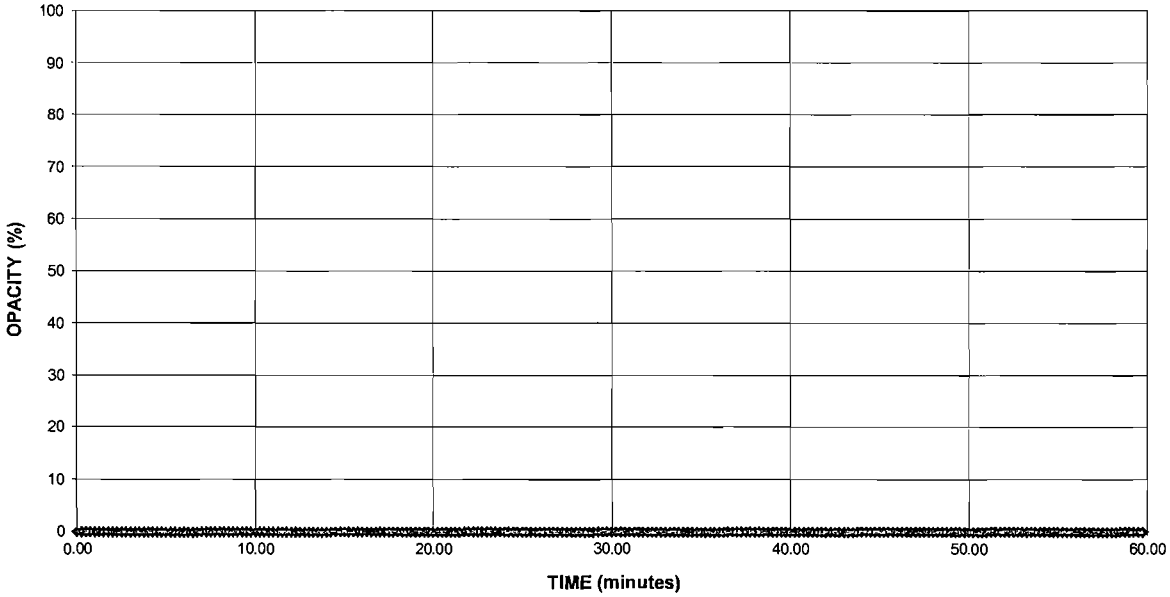
OPACITY RESULTS
(6 minute averages)



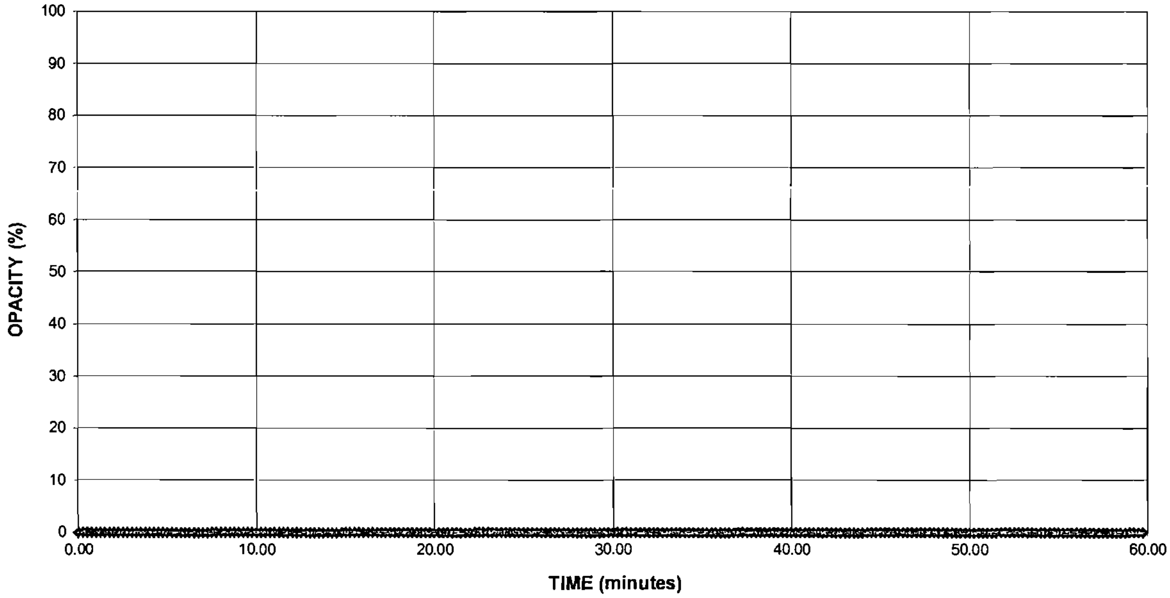
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit 3A Base wDB
Location:	West County Energy Center
Date:	March 17, 2011
Project #:	bv-10-westcounty.fl-comp#2

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: ____

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base w/DB
Control Equipment HRSG Operating Mode Base

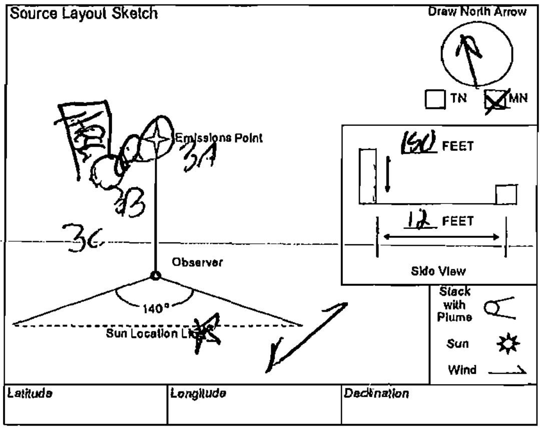
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 5° End 5°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 185° End 185°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 185° End 500 ft @ 185°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End clear
Wind Speed Start 10-15 End 10-15
Wind Direction Start NNE End NNE
Ambient Temp. Start 70 End 77
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3ADB-1 Page 1 of 6
Continued on Form Number bv-10-westcounty-fl-3ADB
Observation Date 17 Mar
Time Zone Eastern
Start Time 1115
End Time 1214

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature
Date 17 Mar 11
Organization AHI
Certified By ETA
Date 02-Sep-10

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ________

Company Name FPL

Facility Name West county Energy Center

Street Address 20505 St Rd 80

City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode [illegible] w/DB

Control Equipment HRSG Operating Mode Base

Describe Emissions Pont combine Cycle natural Gas Turbine with no visible Emissions

Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft

Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start 5° End 5°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 185° End 85°

Distance and Direction to Observation Point from Emission Point Start ~~[illegible]~~ 500ft @185° End ~~[illegible]~~ 500ft @ 125°

Describe Emissions Start NV End NV

Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

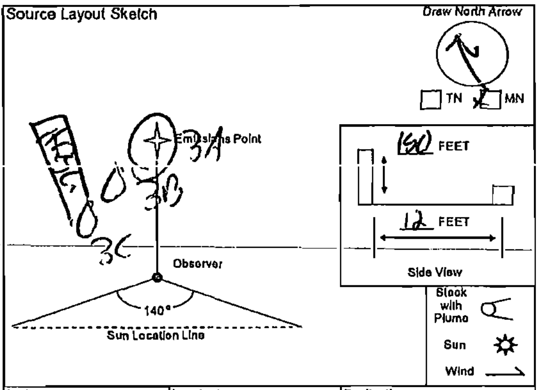
Describe Plume Background Start Sky End Sky

Background Color Start Blue End Blue Sky Conditions Start Clear End Clear

Wind Speed Start 18-15 End 10-15 Wind Direction Start NNE End NNE

Ambient Temp. Start 72 End 77 Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

Form Number bv-10-westcounty-f1-3ADB-2 Page 2 of 6

Continued on Form Number bv-10-westcounty-f1-3ADB-1

Observation Date 17 Mar 11 Time Zone Eastern Start Time 1115 End Time 1214

Min. \ Sec.	0	15	30	45	Comments
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) Rob White

Observer's Signature Date 17 Mar 11

Organization AHI

Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit# 3A Operating Mode Base w/DB
Control Equipment HRSG Operating Mode Base

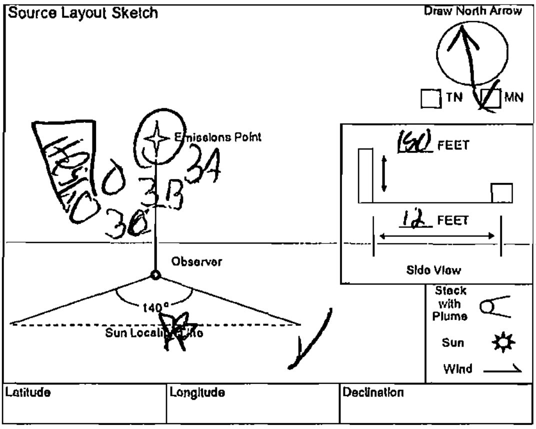
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 5° End 5°

Vertical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 185° End 185°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 185° End 500 ft @ 185°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start 10-15 End 10-15
Wind Direction Start NNE End NNE
Ambient Temp. Start 77 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3ADB-3 Page 3 of 6
Continued on Form Number bv-10-westcounty-f1-3ADB-2
Observation Date 17Mar11 Time Zone East 1A Start Time 1000 End Time 1319

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 17 Mar 11
Organization AHI
Certified By ETA Date 22-Sep-10

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base 4DB
Control Equipment HRSG Operating Mode Base

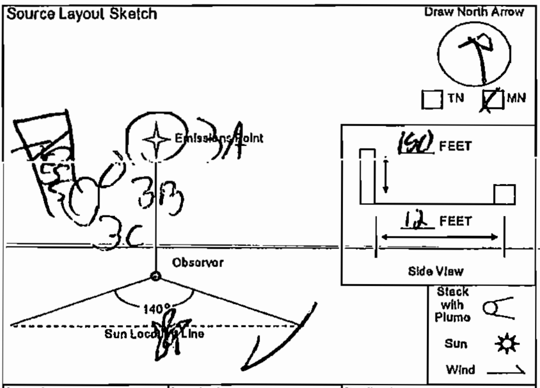
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 5° End 5°

Vertical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 186° End 186°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 185° End 500 @ 185°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End clear
Wind Speed Start 0-15 End 10-15
Wind Direction Start NNE End NNE
Ambient Temp. Start 72 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3ADB-4 Page 4 of 6
Continued on Form Number bv-10-westcounty-f1-3ADB-3
Observation Date 17Mar
Time Zone Eastern
Start Time 1220
End Time 1319

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature
Date 17Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____

Company Name: FPL
Facility Name: West County Energy Center
Street Address: 20505 St Rd 80
City: Loxahatchee State: FL Zip: 33470

Process: NG Unit #: 3A Operating Mode: Base w/DB
Control Equipment: HRSG Operating Mode: Base

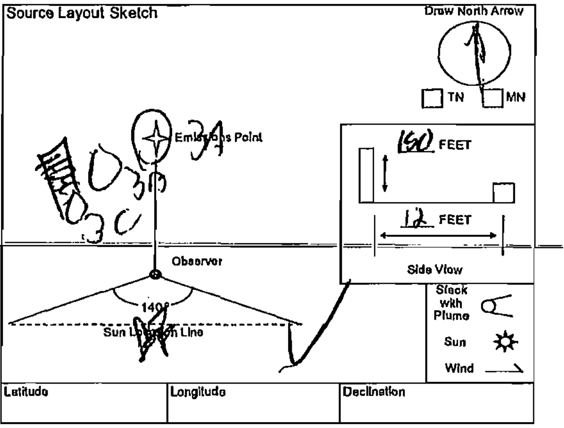
Describe Emissions Point: combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start ~~185~~ 5° End ~~185~~ 5°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 185° End 185°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 185° End 500 ft @ 185°

Describe Emissions Start NV End NV
Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue Sky Conditions Start Clear End clear
Wind Speed Start 10-15 End 10-15 Wind Direction Start NNE End NNE
Ambient Temp. Start 81 End 83 Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number: bv-10-westcounty-f1-3ADB-5 Page 5 of 6
Continued on Form Number: bv-10-westcounty-f1-3ADB-4
Observation Date: 17Mar11 Time Zone: Eastern Start Time: 1323 End Time: 1402

Min. \ Sec.	0	15	30	45	Comments
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): Rob White
Observer's Signature: Rob White Date: 17Mar11
Organization: AHI
Certified By: ETA Date: 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3A Operating Mode Base w/DB
Control Equipment HRSG Operating Mode Base

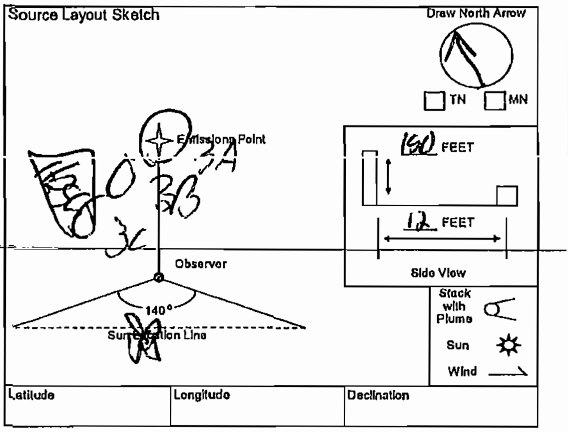
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 5° End 5°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 185° End 185°
Distance and Direction to Observation Point from Emission Point Start 500 ft @185° End 500 ft @185°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start 10-15 End 10-15
Wind Direction Start NNE End NNE
Ambient Temp. Start 81 End 83
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number WV-10-westcounty-FL-3ADB-6 Page 6 of 6
Continued on Form Number WV-10-westcounty-FL-3ADB-5
Observation Date 17 Mar 11
Time Zone Eastern
Start Time 1323
End Time 1422

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 17 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

CALCULATIONS

EXAMPLE CALCULATIONS (FFACTOR)

RM 19, (12-17-09),
2.0 Summary of Method,
2.1 Emission Rates. Oxygen (O_2) or carbon dioxide (CO_2) concentrations and appropriate F factors (ratios of combustion gas volumes to heat inputs) are used to calculate pollutant emission rates from pollutant concentrations.

RM 19, (12-17-09),
12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in lb/MMBtu. The pollutant concentration must be in lb/scf and the F factor must be in scf/MMBtu. If the pollutant concentration (C) is not in the appropriate units, use Table 19–1 in Section 17.0 to make the proper conversion. An F factor is the ratio of the gas volume of the products of combustion to the heat content of the fuel. The dry F factor (F_d) includes all components of combustion less water, the wet F factor (F_w) includes all components of combustion, and the carbon F factor (F_c) includes only carbon dioxide.

Mark's Std Hdbk, 10th ed.,pg 4-26
High Heat Value Dry (HHV_{dry}), calc for Methane (single component for the fuel gas)

$$HHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times GCM\right] \qquad HHV_{dry}=\frac{97.64\ \%}{100.00}\times\frac{994.85\ Btu}{SCF}=\frac{971.41\ \ Btu}{SCF}$$

Mark's Std Hdbk, 10th ed., pg 4-26
Low Heat Value Dry (LHV_{dry}), calc for Methane (single component for the fuel gas)

$$LHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times NCM\right] \qquad LHV_{dry}=\frac{97.64\ \%}{100.00}\times\frac{895.75\ Btu}{SCF}=\frac{874.65\ \ Btu}{SCF}$$

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

$$HHV_{wet}(Btu/SCF)=\frac{HHV_{dry}}{W/D.factor} \qquad HHV_{wet}=\frac{989.23\ Btu/SCF}{1.0236}=966.42\ Btu/SCF$$

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

$$LHV_{wet}(Btu/SCF)=\frac{LHV_{dry}}{W/D.factor} \qquad LHV_{wet}=\frac{890.97\ Btu/SCF}{1.0236}=870.43\ Btu/SCF$$

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

$$CM(lb/lb-mol)=\left[\left(\frac{M_{\%}}{100}\right)\times MW\right] \qquad CM=\frac{97.64\ \%}{100.00}\times\frac{16.04\ \ lb}{lb\text{-}mol}=15.67\ \ lb/lb\text{-}mol$$

ASTM D 3588
Fuel Molecular Weight (MW_{Fuel})

$$MW_{Fuel}(lb/lb\cdot mol)=\left[\sum(CM)\right]$$

MW_{Fuel} = 15.67 lb/lb-mol
+ 0.25 lb/lb-mol
+ etc. = 16.519 lb/lb-mol

Btu per Lb of Gas Gross (**GCV**)

$$GCV(Btu/lb)=\left[\frac{HHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$GCV=\frac{989.23\ \ Btu/SCF\ \ x\ \ 385.23\ \ ft^3/lbmol}{16.519\ lb/lb\text{-}mol}=23{,}068.68\ Btu/lb$$

ASTM D 3588 (SG)
Specific Gravity

$$SG=\left[\frac{MW_{Fuel}}{MW_{AIR}}\right] \qquad SG=\frac{16.52\ lb/lb\text{-}mol}{28.96\ lb/lb\text{-}mol}=0.5704$$

Btu per Lb of Gas Net (**NCV**)

$$NCV(Btu/lb)=\left[\frac{LHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$NCV=\frac{890.97\ \ Btu/SCF\ \ x\ \ 385.23\ \ ft^3/lbmol}{16.519\ lb/lb\text{-}mol}=20{,}777.37\ Btu/lb$$

Weight Percent of Component ($C_{\%}$), methane

$$C_{\%}(\%)=\left[\left(\frac{CM}{MW_{Fuel}}\right)\times 100\right]$$

$$C_{\%}=\frac{15.67\ lb/lb\text{-}mol}{16.52\ lb/lb\text{-}mol}\times\ 100\ =\ 94.83\ \%$$

Weight Percent of Volatile Organic Compounds ($VOC_{\%}$)

$$VOC_{\%}(\%)=\left[\sum_{C_3H_8}^{C_6H_{14}}M_{\%}\right] \qquad VOC_{\%}=\ 0.20\ \%\ +\ 0.04\ \%\ +\ 0.03\ \%\ +\ etc.=\ 0.33\ \%$$

RM 19, (12-17-09), 12.3.2 Determined **F Factors**. If the fuel burned is not listed in Table 19–2 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19–2, use the procedure below: 12.3.2.1 Equations. Use the eq

RM 19, (07-19-6),
12.1 Nomenclature

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

K (scf/lb)/%

H	3.64
C	1.53
S	0.57
N_2	0.14
O_2	0.46

$$F_d=\frac{10^6Btu}{MMBtu}\times\left(\frac{3.64\ SCF}{lb\cdot\%}\times\ 24.20\ \%+\frac{1.53\ SCF}{lb\cdot\%}\times\ 73.19\ \%+\frac{0.57\ SCF}{lb\cdot\%}\times\ 0.00\ \%+\frac{0.14\ SCF}{lb\ \ \%}\times\ 0.76\ \%-\frac{0.46\ SCF}{lb\cdot\%}\times\ 1.84\ \%\right)\times\frac{lb}{23{,}068.68\ Btu}=\frac{8{,}641.06\ SCF}{MMBtu}$$

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

EXAMPLE CALCULATIONS (INFORMATION)

Specific Humidity (RH_{sp})

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

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

$$RH_{sp} = \frac{65.80\text{ gr}}{\text{lb}} \text{ x } \frac{\text{I lb}}{7000\text{ gr}} = 0.009400\,\frac{\text{lb }H_2O}{\text{lb Air}}$$

Fuel Flow Conversion (Q_f)

Note: Qf(lb/min) is a value obtained from the source operator.

$$Q_f = \left[Q_f \times G \times \left(\frac{1}{MW_{Fuel}}\right)\right]$$

$$Q_f = \frac{1{,}858.62\text{ lb}}{\text{min}} \text{ x } \frac{60\text{ min}}{\text{hr}} \text{ x } \frac{385.23\text{ ft}^3}{\text{lb-mol}} \text{ x } \frac{\text{lb-mol}}{16.52\text{ lb}} = 2{,}600{,}562\text{ SCFH}$$

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.

$$CIP / CDP = \left[(psig + P) \times \frac{51.71493\,mmHg}{1\,psi}\right]$$

$$\text{CIP / CDP} = \left[272.1\text{ psig} + 14.8574\right] \text{ x } \frac{51.71493\ mmHg}{1\text{ psia}} = 14{,}842\text{ mmHg (abs)}$$

Heat Rate (MMBtu/hr)

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

$$\text{Heat Rate} = \frac{890.97\text{ Btu}}{\text{SCF}} \text{ x } \frac{2{,}604{,}564.04\text{ SCF}}{\text{hr}} \text{ x } \frac{\text{MMBtu}}{10^6\text{ Btu}} = \frac{2{,}320.60\quad\text{MMBtu}}{\text{hr}}$$

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

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)

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

$$\text{ACE} = \frac{5.00\text{ ppm} - \ 4.93\text{ ppm}}{12.10\text{ ppm}} \text{ x } 100 = 0.58\ \%$$

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)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)}$$

Eq. of a line
y=mx+b

$$E_p = \frac{8.42\text{ ppm} - \ -0.02\text{ ppm}}{8.46\text{ ppm} - \ 0.00\text{ ppm}} \text{ x } 4.76\text{ ppm} + -0.02 = 4.73\text{ ppm}$$

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

$$ACE_{THC} = \frac{4.76\text{ ppm} - \ 4.73\text{ ppm}}{4.76\text{ ppm}} \text{ x } 100 = 0.66\ \%$$

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)

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

$$SB = \frac{4.84 \text{ ppm} - 5.00 \text{ ppm}}{12.10 \text{ ppm}} \times 100 = -1.32 \ \%$$

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)

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

$$D = |\ -1.98 \ \% - \ -1.32 \ \% \ | = 0.66 \ \%$$

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)

$$SB / D_{Alt} = \left|C_S - C_{Dir}\right| \qquad \text{Eq. Section 13.2 and 13.3}$$

$$SB / D_{Alt} = |\ 4.84 \text{ ppm} - 5.00 \text{ ppm} \ | = 0.16 \text{ ppm}$$

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)

$$C_{Gas} = \left(C_{Avg} - C_O\right) \times \left(\frac{C_{MA}}{C_M - C_O}\right) \qquad \text{Eq. 7E-5b}$$

$$C_{Gas} = \left(2.50 \text{ ppm} - 0.12 \text{ ppm}\right) \times \left(\frac{4.93 \text{ ppm}}{4.80 \text{ ppm} - 0.12 \text{ ppm}}\right) = 2.51 \text{ ppm}$$

EXAMPLE CALCULATIONS (RUNS)

Stack Exhaust Flow (Q_S) - RM19

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000}\right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}}\right)$$

$$Q_S = \frac{8{,}641.06 \text{ SCF}}{\text{MMBtu}} \times \frac{2{,}604{,}564.04 \text{ SCF}}{\text{hr}} \times \frac{989.23 \text{ Btu}}{\text{SCF}} \times \frac{\text{MMBtu}}{10^6 \text{ Btu}} \times \left[\frac{20.90\%}{20.9\% - 13.1 \ \%}\right] = 59{,}616{,}705.62 \text{ SCFH}$$

Diluent-Corrected Pollutant Concentration, O_2 Based

RM 20, (11-26-02), 7.3.1 Correction of Pollutant Concentration Using O_2 Concentration. Calculate the O_2 corrected pollutant concentration, as follows: (calc for NOx gas, Run 1, if applicable)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right) \qquad \text{Eq. 20-4}$$

$$C_{adj} = 2.51 \text{ ppm} \times \left(\frac{20.9\% - 15.00 \ \%}{20.9\% - 13.09 \ \%}\right) = 1.90 \text{ ppm@15\%}O_2$$

Diluent-Corrected Pollutant 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)

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

$$C_{ISO} = 1.90 \text{ ppm@15\%}O_2 \times \left(\sqrt{\frac{\dfrac{272.1 \text{ psig} + 14.69232 \text{ psi}}{0.01933677 \text{ psi/mm Hg.}}}{\dfrac{272.1 \text{ psig} + 14.8574 \text{ psi}}{0.01933677 \text{ psi/mm Hg.}}}}\right) \times 2.718^{(19x(\ 0.009400 \text{ lb/lb}-0.00633))} \times \left(\frac{288 \text{ K}}{296 \text{ K}}\right)^{1.53} = 1.93 \text{ ppm@15\% and ISO}$$

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)

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

$$E_{lb/hr} = \frac{2.51 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{59{,}616{,}706 \text{ SCFH} \times 46.01 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{17.88 \text{ lb}}{\text{hr}}$$

Emissions Rate (ton/year)

Calculation for tons per year emission rate based on 8760 hours per year. Calculate, as follows: (calc for NOx gas Run 1, if applicable)

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

$$E_{ton/yr} = \frac{17.88 \text{ lb}}{\text{hr}} \times \frac{8{,}760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}} = \frac{78.34 \text{ ton}}{\text{year}}$$

Emissions Rate (lb/MMBtu)

RM 19, (12-17-09), 12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in ng/J (lb/million Btu). (calc for NOx gas Run 1, if applicable)

Oxygen Based

12.2.1 Oxygen-Based F Factor, Dry Basis. When measurements are on a dry basis for both O_2 (%O_2d) and pollutant (Cd) concentrations, use the following equation:

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}} \qquad \text{Eq. 19-1}$$

$$E_{lb/MMBtu} = \frac{2.51 \text{ ppm} \times 8{,}641.06 \text{ SCF/MMBtu} \times 0.0000001194 \text{ lb/ppm*ft}^3 \times 20.9\%}{20.9\% - 13.09 \ \%} = \frac{0.007 \text{ lb}}{\text{MMBtu}}$$

Conversion Constant

Convc for NOx

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

$$Conv_c = \frac{\frac{46.01 \text{ lb}}{\text{lb•mole}} \times \frac{\text{lb•mole}}{385.23 \text{ SCF}}}{10^6} = \frac{0.0000001194 \text{ lb}}{\text{ppm-ft}^3}$$

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

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

$$D(in.) = L_{fw} - L_{nw}$$

D (in.) = 282.38 in. - 19.00 in. = 263.38 in.

Stack Diameters Downstream

$$B_D(dia.) = \frac{B}{D}$$

$$B_D \text{ (dia.)} = \frac{531.75 \text{ in.}}{263.38 \text{ in.}} = 2.02 \text{ diameters}$$

Area of Stack (ft^2)

$$A_s(ft^2) = \pi \times \left(\frac{D}{2 \times 12}\right)^2$$

2

$$A_s \text{ (ft}^2\text{)} = 3.14 \text{ x } \left(\frac{263.38 \text{ in.}}{2 \text{ x } 12\text{in./ft}} \right)^2 = 378.35 \text{ ft}^2$$

Stack Diameters Upstream

$$A_D(dia.) = \frac{A}{D}$$

$$A_D \text{ (dia.)} = \frac{144.00 \text{ in.}}{263.38 \text{ in.}} = 0.55 \text{ diameters}$$

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

EXAMPLE CALCULATIONS (Reference Method 3a) [Values from Run 1 test]

Carbon Monoxide Concentration (%)

$$\%CO = \frac{ppmCO}{10{,}000}$$

$$\%CO\ (\%) = \frac{0.88\ \text{ppm}}{10{,}000\ \text{ppm/\%}} = 0.0000\ \%$$

Nitrogen Concentration (%)

$$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$$

$\%N_2$ (%) = 100 - 4.43 % - 13.09 % - 0.88 / 10,000 % = 82.48 %

Stack Dry Molecular Weight (lb/lb-mole)

$$M_d(lb/lb-mol) = \sum\left(\frac{MW_{comp}}{100} \times \%component\right)$$

$$M_d\ (\text{lb/lb-mol}) = \left(\frac{44\ \text{lb/lb-mol}}{100} \times 4.43\ \%\right) + \left(\frac{32\ \text{lb/lb-mol}}{100} \times 13.09\ \%\right) + \left(\frac{28\ \text{lb/lb-mol}}{100} \times \left[\frac{0.88}{10{,}000} + 82.48\right]\right) = \frac{29.23\ \text{lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

$$M_S(lb/lb-mol) = \left[M_d \times \left(1 - \frac{B_{ws}}{100}\right)\right] + \left[MW_{H_2O} \times \frac{B_{ws}}{100}\right]$$

$$M_S\ (\text{lb/lb-mol}) = \left\{\frac{29.23\ \text{lb}}{\text{lb-mol}} \times \left(1 - \frac{9.12\ \%}{100}\right)\right\} + \left\{\frac{18\ \text{lb}}{\text{lb-mol}} \times \frac{9.12\ \%}{100}\right\} = \frac{28.21\ \text{lb}}{\text{lb-mol}}$$

Average Calculated Fuel Factor (F_o)

$$F_{o(avg)} = \frac{[20.9 - (\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})]}{(\%CO_2)_{avg} + (\%CO)_{avg}}$$

$$F_{o(avg)} = \frac{20.9\% - 13.09\ \% - (0.5 \times 0.000\ \%)}{4.43\ \% + 0.000\ \%} = 1.760$$

Average Excess Air (%)

$$\%EA_{avg}(\%) = \frac{100 \times [(\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})]}{(0.264 \times (N_2)_{avg}) - [(\%O_2)_{avg} - (0.5 \times (\%CO)_{avg})]}$$

$$(\%EA)_{AVG} = \frac{100 \times \{13.09\ \% - (0.5 \times 0.000\ \%)\}}{(0.264 \times 82.48\ \%) - \{13.09\ \% - (0.5 \times 0.000\ \%)\}} = 150.73\ \%$$

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

EXAMPLE CALCULATIONS (Reference Method 2) [Values from Run 1 test]

Absolute Stack Pressure (in. Hg)

$$P_s(in.Hg) = P_b + \frac{P_{static}}{13.6}$$

$$P_s \text{ (in. Hg)} = 30.25 \text{ in. Hg} + \frac{0.81 \text{ in. } H_2O}{13.6 \text{ in. } H_2O/\text{in. Hg}} = 30.31 \text{ in. Hg}$$

Average Stack Gas Velocity (ft/sec)

$$v_s(ft/\sec) = K_p \times C_p \times \left(\sqrt{\Delta p}\right)_{avg} \times \sqrt{\frac{(t_s)_{avg} + T_u}{P_s \times M_s}}$$

v_{sl} (ft/sec) =

$$\left(\frac{85.49 \text{ ft} \quad (\text{lb/lb-mol})(\text{in. Hg})}{\text{sec} \quad (^\circ\text{R})(\text{in. } H_2O)}\right)^{1/2} \times 0.84 \times 1.00 \text{ in.} H_2O^{1/2} \times \sqrt{\frac{273.92 \quad + 460\ ^\circ\text{R}}{30.31 \text{ in. Hg} \times 28.21 \text{ lb/lb-mol}}} = \frac{66.2 \text{ ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

$$Q_{sd}(dscfh) = \frac{60 \times 60 \times \left(1 - \frac{B_{ws}}{100}\right) \times v_s \times A_s \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sd} \text{ (dscf/hr)} = \frac{3600 \text{ sec}}{\text{hr}} \times \left(1 - \frac{9.12 \ \%}{100}\right) \times \frac{66.25 \text{ ft}}{\text{sec}} \times 378.35 \text{ ft}^2 \times$$

$$\frac{68.00 \quad + 460\ ^\circ\text{R}}{273.92 \quad + 460\ ^\circ\text{R}} \times \frac{30.31 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{59{,}762{,}784.30 \text{ dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

$$Q_{aw}(acfm) = 60 \times v_s \times A_s$$

$$Q_{aw} \text{ (acf/min)} = \frac{60 \text{ sec}}{\text{min}} \times \frac{66.25 \text{ ft}}{\text{sec}} \times 378.35 \text{ ft}^2 = \frac{1{,}503{,}859.69 \text{ acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

$$Q_{sw}(ascfh) = \frac{60 \times Q_{aw} \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sw} \text{ (ascf/hr)} = \frac{60 \text{ min}}{\text{hr}} \times \frac{1{,}503{,}859.69 \text{ acf}}{\text{min}} \times$$

$$\frac{68.00 \quad + 460\ ^\circ\text{R}}{273.92 \quad + 460\ ^\circ\text{R}} \times \frac{30.31 \text{ in. Hg}}{29.92 \text{ in. Hg}} = \frac{65{,}760{,}297.04 \text{ ascf}}{\text{hr}}$$

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

EXAMPLE CALCULATIONS (Reference Method 4) [Values from Run 1 test]

Water Volume Weighed (scf)

$$V_{wsg(std)}(scf) = W_t \times K_5$$

$$V_{wsg(std)} = 92.30\ \text{g} \times 0.04715\ \text{ft}^3\text{/g} = 4.350\ \text{scf}$$

Standard Meter Volume (dscf)

$$V_{m(std)}(dscf) = \frac{K_1 \times Y \times V_m \times \left(P_b + \frac{\Delta H_{avg}}{13.6}\right)}{(t_m)_{avg} + T_u}$$

$$V_{m(std)} = \frac{\frac{17.65\ ^\circ\text{R}}{\text{in. Hg}} \times 0.99 \times 46.55\ \text{dcf} \times \left(30.25\ \text{in. Hg} + \frac{1.85\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\text{ / in. Hg}}\right)}{110.42\ ^\circ\text{F} + 460\ ^\circ\text{R}} = 43.37\ \text{dscf}$$

Calculated Moisture Content (%)

$$B_{ws(calc)}(\%) = 100 \times \frac{V_{wsg(std)}}{V_{wsg(std)} + V_{m(std)}}$$

$$B_{ws(calc)} = 100 \times \frac{4.35\ \text{dscf}}{4.35\ \text{dscf} + 43.37\ \text{dscf}} = 9.12\ \%$$

Saturated Moisture Content (%)

$$B_{ws(svp)}(\%) = 100 \times \frac{10^{6.691 - \frac{3144}{t_{s(avg)} - 390.86}}}{P_b + \frac{P_{static}}{13.6}} \le 100$$

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{273.92\ ^\circ\text{F} + 390.86}\right)}}{30.25\ \text{in. Hg} + \frac{0.81\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\text{ / in. Hg}}} \le 100 = 100.00\ \%$$

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

EXAMPLE CALCULATIONS (Isokinetic Sampling) [Values from Run 1 test]

Desired Orifice (in. H_2O) (first point)

$$\Delta H_d(in.H_2O) = K \times \Delta p$$

ΔH_d (in. H_2O) = 1.94 x 0.88 in. H_2O = 1.71 in. H_2O

Absolute Meter Pressure (in. Hg)

$$P_m(in.Hg) = P_b + \frac{\Delta H@}{13.6}$$

$$P_m \text{ (in. Hg)} = 30.25 \text{ in. Hg} + \frac{1.75 \text{ in. } H_2O}{13.6 \text{ in. } H_2O\text{/in. Hg}} = 30.38 \text{ in. Hg}$$

Recommended Nozzle Diameter (in.)

$$D_n(in.) = \sqrt{\frac{C_n \times Q_m \times P_m}{(t_m+T_u)\times C_p} \times \left(\frac{1-\frac{B_{wm}}{100}}{1-\frac{B_{ws}}{100}}\right) \times \sqrt{(t_s+T_u)\times\left[\frac{M_d\times\left(1-\frac{B_{ws}}{100}\right)+\left(18\times\frac{B_{ws}}{100}\right)}{P_s\times\Delta p_{avg}}\right]}}$$

$$D_{ni} \text{ (in.)} = \sqrt{\frac{\frac{0.03575 \text{ (lb-mole}\bullet{}^{o}\text{R}\bullet\text{in. } H_2O)^{1/2}\bullet\text{min}\bullet\text{in.}^2}{\text{acf}\bullet\text{in. Hg}^{3/4}\bullet\text{lb}^{1/2}} \text{ x } 0.75 \text{ acf x } 30.38 \text{ in. Hg}}{\left[110.42 \text{ }^{o}\text{F} + 460^{o}\text{R}\right] \text{x } 0.84} \text{ x } \left(\frac{1 - \frac{0.00 \text{ \%}}{100}}{1 - \frac{9.12 \text{ \%}}{100}}\right) \text{ x } \sqrt{(273.92 \text{ }^{o}\text{F} + 460^{o}\text{R}) \text{ x } \frac{\frac{29.23 \text{ lb}}{\text{lb-mole}} \text{ x } \left(1 - \frac{9.12 \text{ \%}}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{9.12 \text{ \%}}{100}\right)}{30.31 \text{ in. Hg x } 1.00 \text{ in. } H_2O}}} = 0.210 \text{ in.}$$

ΔP to ΔH Isokinetic Factor

$$K = C_k \times C_p^2 \times \Delta H@ \times D_{na}^4 \times \left[\frac{M_d\times\left(1-\frac{B_{wm}}{100}\right)+\left(18\times\frac{B_{wm}}{100}\right)}{M_d\times\left(1-\frac{B_{ws}}{100}\right)+\left(18\times\frac{B_{ws}}{100}\right)}\right]\times\left(\frac{1-\frac{B_{ws}}{100}}{1-\frac{B_{wm}}{100}}\right)^2\times\left(\frac{t_m+T_u}{ts+T_u}\right)\times\frac{P_s}{P_m}$$

$$K = \frac{849.8}{\text{in. } H_2O\bullet\text{in.}^4} \text{ x } 0.84^{2} \text{ x } 1.75 \text{ in. } H_2O \text{ x } 0.23^{4} \text{ x } \left(\frac{1 - \frac{9.12 \text{ \%}}{100}}{1 - \frac{0.00 \text{ \%}}{100}}\right)^2 \text{ x } \frac{110.42 \text{ }^{o}\text{F} + 460^{o}\text{R}}{273.92 \text{ }^{o}\text{F} + 460^{o}\text{R}} \text{) x}$$

$$\left(\frac{\frac{29.23 \text{ lb}}{\text{lb/mole}} \text{ x } \left(1 - \frac{0.00 \text{ \%}}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{0.00 \text{ \%}}{100}\right)}{\frac{29.23 \text{ lb}}{\text{lb/mole}} \text{ x } \left(1 - \frac{9.12 \text{ \%}}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \text{ x } \frac{9.12 \text{ \%}}{100}\right)}\right) \text{ x } \frac{30.31 \text{ in. Hg}}{30.38 \text{ in. Hg}} = 1.94$$

Cumulative Percent Isokinetic (%) (first point)

$$I(\%) = \frac{K_4 \times \left((t_s)_{avg} + T_u\right)\times V_{m(std)}}{\left(\Theta\times\left(v_{s(I)}\right)_{avg}\times P_s\times\pi\times\left(\frac{D_{na}}{2}\times\frac{1}{12}\right)^2\right)\times\left(1-\frac{B_{ws}}{100}\right)}$$

$$I \text{ (\%)} = \frac{\frac{0.0945 \text{ min}\bullet\text{in. Hg}}{\text{sec}\bullet{}^{o}\text{R}} \text{ x } (276.00 \text{ }^{o}\text{F} + 460 \text{ }^{o}\text{R}) \text{ x } 1.79 \text{ dscf}}{2.50 \text{ min x } \frac{62.50 \text{ ft}}{\text{sec}} \text{ x } 30.31 \text{ in. Hg x } 3.14 \text{ x } \left(\frac{0.23 \text{ in.}}{2} \text{ x } \frac{\text{ft.}}{12 \text{ in.}}\right)^2 \text{ x } \left(1 - \frac{9.12 \text{ \%}}{100}\right)} = 100.01 \text{ \%}$$

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

EXAMPLE CALCULATIONS (CTM-027 Ammonia Analysis) [Values from Run 1 test]

Dry Gas Meter Volume (L)

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

V_m (L) = 43.37 dscf x 28.31685 L/dscf = 1227.97 L

Volume of NH_3 (L)

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

V_a (L) =

$$\left(\frac{4.57 \text{ mg}}{\text{L}} \times \frac{200.00 \text{ ml}}{1} \times \frac{\text{L}}{1000 \text{ ml}} \times \frac{22.4 \text{ L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03 \text{ g}} \times \frac{\text{g}}{1000 \text{ mg}}\right) +$$

$$\left(\frac{0.08 \text{ mg}}{\text{L}} \times \frac{180.00 \text{ ml}}{1} \times \frac{\text{L}}{1000 \text{ ml}} \times \frac{22.4 \text{ L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03 \text{ g}} \times \frac{\text{g}}{1000 \text{ mg}}\right) = 0.00 \text{ L}$$

NH_3 Concentration (ppmvd)

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

$$C_{NH3} \text{ (ppmvd)} = \frac{0.00 \text{ L}}{1227.97 \text{ L}} \times 10^6 = 0.99 \text{ ppmvd}$$

NH_3 Concentration (ppmvd@15%O_2)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

$$C_{adj} = 0.99 \text{ ppmvd} \times \left(\frac{20.9\% - 15.00\ \%}{20.9\% - 13.1\ \%}\right) = 0.75 \text{ ppmvd@15\%}O_2$$

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_{WS} = 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_{Dir} = 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 NOx measured in the spiked sample.
C_{Spike} = Concentration of NOx in the undiluted spike gas.
C_{Calc} = Calculated concentration of NOx 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} = NO_2 to NO converter efficiency, percent.
H = High calibration gas, designator.
L = Low calibration gas, designator.
M = Mid calibration gas, designator.
NOFinal = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.
NOxCorr = The NOx concentration corrected for the converter efficiency.
NOxFinal = The final NOx concentration observed during the converter efficiency test in Section 16.2.2.
NOxPeak = The highest NOx concentration observed during the converter efficiency test in Section 16.2.2.
Q_{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 H_2O/g air
e = transcendental constant, 2.718
T_a = ambient temperature, K

Small Engine and FTIR Nomenclature. The terms used in the equations are defined as follows:

bhp = brake horsepower
hp = horsepower
Q_{sys} = system flow (lpm)
Q_m = matrix spike flow (lpm)

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_{wo} = 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_{ao}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).
E_{bi} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).
E_{bo} = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).
E_{ci} = Pollutant rate in combined effluent, ng/J (lb/million Btu).
E_{co} = Pollutant emission rate in combined effluent, ng/J (lb/million Btu).
E_d = Average pollutant rate for each sampling period (e.g.,24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (e.g., amount of fuel bunkered), ng/J (lb/million Btu).
E_{di} = Average inlet SO_2 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 *(lbs/million Btu)* or *ppm corrected* to 7 *percent* O_2.
E_{jo},E_{ji} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
E_h = Hourly average pollutant, ng/J (lb/million Btu).
E_{hj} = Hourly arithmetic average pollutant rate for hour "j," ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.
Fc = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19
F_d, F_w, F_c = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).
ft^3 = cubic feet
G = ideal gas conversion factor
(385.23 SCF/lb-mol at 68 deg F & 14.696 psia)
GCM = gross Btu per SCF (constant, compound based)
GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).
GCV_p, GCV_r = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).
$\%_H$ = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.
H_b = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).
H_g = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).
$\%_{H2O}$ = Concentration of water from an ultimate analysis of fuel, weight percent.
H_r = Total numbers of hours in the performance test period (e.g., 720 hours for 30-day performance test period).
K = volume of combustion component per pound of component (constant)
K = Conversion factor, 10^{-5} (kJ/J)/(%) [10^6 Btu/million Btu].
K_c = (9.57 scm/kg)/% [(1.53 scf/lb)/%].
K_{cc} = (2.0 scm/kg)/% [(0.321 scf/lb)/%].
K_{hd} = (22.7 scm/kg)/% [(3.64 scf/lb)/%].
K_{hw} = (34.74 scm/kg)/% [(5.57 scf/lb)/%].
K_n = (0.86 scm/kg)/% [(0.14 scf/lb)/%].
K_n = (2.85 scm/kg)/% [(0.46 scf/lb)/%].
K_s = (3.54 scm/kg)/% [(0.57 scf/lb)/%].
K_{sulfur} = $2x10^4$ Btu/wt%-MMBtu
K_w = (1.30 scm/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 = barometirc pressure, in Hg
P_s = Potential SO2 emissions, percent.
$\%_S$ = Sulfur content of as-fired fuel lot, dry basis, weight percent.
S_e = 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}=CO_2 Correction factor, percent.
X_k = Fraction of total heat input from each type of fuel k.

Calculations, Formulas, and Constants

The following information supports the spreadsheets for this testing project.

Given Data:

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

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

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

ASTM D 3588

Molecular Weight of NOx (lb/lb-mole) = 46.01
Molecular Weight of CO (lb/lb-mole) = 28.00
Molecular Weight of SO_2 (lb/lb-mole) = 64.00
Molecular Weight of THC (propane) (lb/lb-mole) = 44.00
Molecular Weight of VOC (methane) (lb/lb-mole) = 16.00
Molecular Weight of NH_3 (lb/lb-mole) = 17.03
Molecular Weight of HCHO (lb/lb-mole) = 30.03

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

Conversion Constant for NOx = 0.0000001194351
Conversion Constant for CO = 0.0000000726839
Conversion Constant for SO_2 = 0.0000001661345
Conversion Constant for THC = 0.0000001142175
Conversion Constant for VOC (methane) = 0.0000000415336
Conversion Constant for NH_3 = 0.0000000442074
Conversion Constant for HCHO = 0.0000000779534
NOTE: units are lb/ppm*ft^3

Formulas:

1. Corrected Raw Average (C_{Gas}), 40CFR60, App. A, RM 7E, Eq. 7E-5 (08/15/06)

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

2. Correction to % O_2, 40CFR60, App. A, RM 20, Eq. 20-5 (11/26/02)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

3. Correction to % O_2 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)

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000}\right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}}\right)$$

5. Emission Rate in lb/hr

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

6. Emission Rate in tons per year

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

7. Emission Concentration in lb/MMBtu (O_2 based)

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}}$$

8. Emission Concentration in g/hp*hr

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

RATA SHEET CALCULATIONS

d = Reference Method Data - CEMS Data
S_d = Standard Deviation
CC = Confident Coefficient
n = number of runs
$t_{0.025}$ = 2.5 percent confidence coefficent T-values
RA = relative accuracy
ARA = alternative relative accuracy
BAF = Bias adjustment factor

n	t	n	t	n	t
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

1. Difference

$$d = \sum_{i=1}^{n} d_i$$

2. Standard Deviation

$$S_d = \sqrt{\frac{\sum_{i=1}^{n} d_i^2 - \left[\frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}\right]}{n-1}}$$

3. Confident Coefficient

$$CC = t_{0.025} \times \frac{S_d}{\sqrt{n}}$$

4. Relative Accuracy

$$RA = \frac{|d_{AVG}| + |CC|}{RM_{AVG}} \times 100$$

5. Alternative Relative Accuracy

$$ARA = \frac{|d_{AVG}| + |CC|}{AS} \times 100$$

5. Bias Adjustment Factor

$$BAF = 1 + \left(\frac{|d_{AVG}|}{CEM_{AVG}}\right)$$

Nomenclature

- $\%CO$ = carbon monoxide concentration (%)
- $\%CO_2$ = carbon dioxide concentration (%)
- $\%N_2$ = nitrogen concentration (%)
- $\%O_2$ = oxygen concentration (%)
- $\%O_{2,wet}$ = Oxygen content of gas stream, % by volume of wet gas. (Note: The oxygen percentage used in Method 201A, Equation 3 is on a wet gas basis. That means that since oxygen is typically measured on a dry gas basis, the measured percent O2 must be multiplied by the quantity $(1 - B_{ws})$ to convert to the actual volume fraction. Therefore, $\%O_{2,wet} = (1 - B_{ws}) * \%O_{2,\,dry}$)
- $(\%EA)_{avg}$ = average excess air (%)
- $(F_o)_{avg}$ = average calculated fuel factor
- $[(\Delta p)^{0.5}]_{avg}$ = Average of square roots of the velocity pressures measured during the preliminary traverse, inches W.C.
- μ = Gas viscosity, micropoise
- 12.0 = Constant calculated as 60 percent of 20.5 square inch cross-sectional area of combined cyclone head, square inches
- 17.03 = mg/milliequivalents for ammonium ion
- 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)
- 5.02×10^4 = constant derived from the molecular weight and correcting standard temperature and pressure (ref. Bay Area Air Quality Management District, Source Test Procedure ST-1B, Ammonia Integrated Sampling, Adopted January 20, 1982, Regulation 7-303)
- A = distance upstream (in.)
- A_D = stack diameters upstream (dia.)
- An = Area of nozzle, square feet
- A_s = area of stack (ft^2)
- B = distance downstream (in.)
- B_D = stack diameters downstream (dia.)
- b_f = Average blockage factor calculated in Equation 26, dimensionless
- B_{wm} = meter moisture content (%)
- B_{ws} = stack moisture content (%)
- C = Cunningham correction factor for particle diameter, Dp, and calculated using the actual stack gas temperature, dimensionless
- C_1 = -150.3162 (micropoise)
- C_2 = 18.0614 (micropoise/$K^{0.5}$) = 13.4622 (micropoise/$R^{0.5}$)
- $C_3 = 1.19183 \times 10^6$ (micropoise/K^2) = 3.86153×10^6 (micropoise/R^2)
- C_4 = 0.591123 (micropoise)
- C_5 = 91.9723 (micropoise)
- $C_6 = 4.91705 \times 10^{-5}$ (micropoise/K^2) = 1.51761×10^{-5} (micropoise/R^2)
- C_a = Acetone blank concentration, mg/mg
- C_b = Concentration of NH3 ion in the back half of train (breakthrough)
- C_f = Concentration of NH3 ion in the front half of train (main catch)
- C_{fPM10} = Conc. of filterable PM_{10}, gr/dscf
- $C_{fPM2.5}$ = Conc. of filterable $PM_{2.5}$, gr/dscf
- C_k = K Factor Constant, 849.8

Nomenclature

- C_n = nozzle diameter constant, 0.03575
- C_p' = Coefficient for the pitot used in the preliminary traverse, dimensionless
- C_p = Pitot coefficient for the combined cyclone pitot, dimensionless
- C_{cpm} = Concentration of the condensable PM in the stack gas, dry basis, corrected to standard conditions, milligrams/dry standard cubic foot.
- C_r = Re-estimated Cunningham correction factor for particle diameter equivalent to the actual cut size diameter and calculated using the actual stack gas temperature, dimensionless
- D_{50} = Particle cut diameter, micrometers
- $D_{50(N+1)}$ = D_{50} value for cyclone IV calculated during the N+1 iterative step, micrometers
- $D_{50\text{-}1}$ = Re-calculated particle cut diameters based on re-estimated C_r, micrometers
- D_{50LL} = Cut diameter for cyclone I corresponding to the 2.25 micrometer cut diameter for cyclone IV, micrometer
- D_{50N} = D_{50} value for cyclone IV calculated during the Nth iterative step, micrometers
- D_{50T} = Cyclone I cut diameter corresponding to the middle of the overlap zone shown in Method 201A, Figure 10 of Section 17, micrometers
- D_e = equivalent stack diameter (in.)
- $\Delta H@$ = ΔH @ 0.75 scfm (in. H2O)
- ΔH_{avg} = average orifice pressure (in. H_2O)
- D_n = Inner diameter of sampling nozzle mounted on Cyclone I, inches
- D_{na} = actual nozzle diameter (in.)
- D_p = Physical particle size, micrometers
- Δp = velocity head (in. H_2O)
- Δp_1 = velocity head at first current traverse point (in. H_2O)
- $\Delta p'_1$ = velocity head at first preliminary traverse point (in. H_2O)
- Δp_{avg} = average pitot tube differential pressure (in. H_2O)
- Δp_n = velocity head at subsequent current traverse point (in. H_2O)
- Δp_{RM2} = method 2 velocity head (in. H_2O)
- D_s = diameter of stack (in.)
- F_d = fuel f-factor (dscf/MMBtu)
- f_{O2} = stack gas fraction of O_2, by volume, dry basis
- I = Percent isokinetic sampling, dimensionless
- K_1 = standard volume correction, 17.65°R/in. Hg
- K_4 = isokinetic conversion constant, 0.0945min•in.Hg/sec•°R
- K_5 = water mass to std water vapor, 0.04715 ft^3/g
- K_p = 85.49, ((ft/sec)/(pounds/mole -°R))
- L = length of stack (in.)
- L_{fw} = distance to far wall of stack (in.)
- L_{nw} = distance to near wall of stack (in.) [reference]
- $m_{\#x}$ = weight measurements (g)
- M_1 = Milligrams of PM collected on the filter, less than or equal to 2.5 micrometers
- M_2 = Milligrams of PM recovered from Container #2 (acetone blank corrected), greater than 10 micrometers
- M_3 = Milligrams of PM recovered from Container #3 (acetone blank corrected), less than or equal to 10 and greater than 2.5 micrometers

Nomenclature

- M_4 = Milligrams of PM recovered from Container #4 (acetone blank corrected), less than or equal to 2.5 micrometers
- m_a = Mass of residue of acetone after evaporation, mg
- m_c = Mass of the NH4+ added to sample to form ammonium sulfate, mg
- m_{cpm} = Mass of the total condensable PM, mg
- M_d = Molecular weight of dry gas, pounds/pound mole
- m_{fb} = Mass of total CPM in field train recovery blank, mg
- m_{fx} = final weight, avg of last two measurements (g)
- mg = Milligram
- mg/L = Milligram per liter
- m_i = Mass of inorganic CPM, mg
- m_{ib} = Mass of inorganic CPM in field train recovery blank, mg
- M_n = total particulates (mg)
- m_o = Mass of organic CPM, mg
- m_{ob} = Mass of organic CPM in field train blank, mg
- m_r = Mass of dried sample from inorganic fraction, mg
- m_{tx} = tare weight (g)
- MW = molecular weight (lb/lb-mole)
- M_w = Molecular weight of wet gas, pounds/pound mole
- N = Normality of ammonium hydroxide titrant
- N_a = null angle (deg.)
- N_{re} = Reynolds number, dimensionless
- N_{tp} = Number of iterative steps or total traverse points
- P_b = P_{bar} = barometric pressure (in. Hg)
- P_{bar} = barometric pressure (in. Hg)
- ppmCO = carbon monoxide concentration (ppm)
- ppmv = Parts per million by volume
- ppmw = Parts per million by weight
- P_s = absolute stack pressure (in. Hg)
- P_{static} = static pressure (in. H_2O)
- P_{std} = standard pressure, 29.92 in. Hg
- Θ = total sampling time (min)
- Q_{aw} = average stack wet flow rate (ascf/min)
- Q_I = Sampling rate for cyclone I to achieve specified D_{50}
- Q_m = estimated orifice flow rate, 0.750 acfm, else Vm/Q from previous run
- Q_s = Sampling rate for cyclone I to achieve specified D_{50}
- $Q_{s(std)}$ = total cyclone flow rate at standard conditions (dscf/min)
- Q_{sd} = dry standard stack flow rate (dscfm)
- Q_{sST} = Dry gas sampling rate through the sampling assembly, dscfm
- Q_{sw} = wet standard stack flow rate (ascfm)
- R_{max} = Nozzle/stack velocity ratio parameter, dimensionless
- R_{min} = Nozzle/stack velocity ratio parameter, dimensionless
- t_1 = Sampling time at point 1, min
- t_m = average gas meter temperature (^{o}F)

Nomenclature

- t_m = average meter temperature (^oF)
- T_m = Meter box and orifice gas temperature, ^oR
- t_n = Sampling time at point n, min
- t_r = Total projected run time, min
- T_s = Absolute stack gas temperature, ^oR
- T_{std} = standard temperature, 68^{o}F, 528^{o}R
- T_u = absolute temperature offset, 460^{o}R
- V_a = Volume of acetone blank, ml
- V_{aw} = Volume of acetone used in sample recovery wash, ml
- V_b = Volume of aliquot taken for IC analysis, ml
- V_c = Quantity of water captured in impingers and silica gel, ml
- V_f = final impinger volume (ml)
- V_i = initial impinger volume (ml)
- V_{ic} = Volume of impinger contents sample, ml
- V_m = Dry gas meter volume sampled, acf
- $V_{m(std)}$ = standard meter volume (dscf)
- v_{max} = Maximum gas velocity calculated from Equations 18 or 19, ft/sec
- v_{max} = maximum nozzle velocity (ft/sec)
- V_{mf} = final dry gas meter reading (dcf)
- V_{mi} = initial dry gas meter reading (dcf)
- v_{min} = Minimum gas velocity calculated from Method 201A, Equations 16 or 17, ft/sec
- V_{ms} = Dry gas meter volume sampled, corrected to standard conditions, dscf
- v_n = Sample gas velocity in the nozzle, ft/sec
- v_{org} = organics wash volume (ml)
- V_p = Volume of water added during train purge
- v_s = average stack gas velocity (ft/sec)
- v_{sl} = local velocity (ft/sec)
- V_t = total impinger volume (ml) = ;(V_f-V_i)
- V_t = Volume of NH4OH titrant, ml
- $V_{w(std)}$ = volume of water vapor in gas sample at standard conditions (scf)
- v_x = blank volume (ml)
- W = width of stack (in.)
- $W_{2,3,4}$ = Weight of PM recovered from Containers #2, #3, and #4, mg
- W_a = Weight of blank residue in acetone used to recover samples, mg
- W_f = final impinger weight (g)
- W_i = initial impinger weight (g)
- W_t = total impinger weight (g) = ;(W_f-W_i)
- w_x = blank weight of solids (g)
- Y = meter calibration factor (a.k.a gamma)
- Z = Ratio between estimated cyclone IV D_{50} values, dimensionless
- γ = Dry gas meter gamma value, dimensionless
- ΔH = Meter box orifice pressure drop, inches W.C.
- $\Delta H@$ = Pressure drop across orifice at flow rate of 0.75 scfm at standard conditions, inches W.C. (Note: Specific to each orifice and meter box.)

Nomenclature

- Δp_1 = Velocity pressure measured at point 1, inches W.C.
- Δp_{avg} = Average velocity pressure, inches W.C.
- Δp_m = Observed velocity pressure using S-type pitot tube in preliminary traverse, inches W.C.
- Δp_{max} = Maximum velocity pressure, inches W.C.
- Δp_{min} = Minimum velocity pressure, inches W.C.
- Δp_n = Velocity pressure measured at point n during the test run, inches W.C.
- Δp_s = Velocity pressure calculated in Method 201a, Equation 25, inches W.C.
- Δp_{s1} = Velocity pressure adjusted for combined cyclone pitot tube, inches W.C.
- Δp_{s2} = Velocity pressure corrected for blockage, inches W.C.
- θ = Total run time, min
- ρ_a = Density of acetone, mg/ml (see label on bottle)
- Σ_n = total number of sampling points

APPENDIX B

UNIT OPERATION PARAMETERS

Florida Power and Light

Air Permit # :	PSD-FL-396
Plant Name or Location:	West County Energy Center
Date:	March 16-17, 2011
Project Number:	bv-10-westcounty.fl-comp#2
Manufacturer & Equipment:	Mitsubishi
Model:	501G
Unit Number:	3A
Test Load:	Base/Base w/DB
Tester(s) / Test Unit(s):	JF/AS/RW/TG/127/206

		RUN					
	UNITS	**1-1**	**1-2**	**1-3**	**2-1**	**2-2**	**2-3**
Start Time	hh:mm:ss	09:47:26	11:03:26	12:21:26	10:05:07	11:25:07	12:43:07
End Time	hh:mm:ss	10:46:56	12:02:56	13:20:56	11:04:37	12:24:37	13:42:37
Bar. Pressure	in. Hg	30.25	30.24	30.25	30.27	30.27	30.25
Amb. Temp.	°F	73	69	77	74	81	84
Rel. Humidity	%	55	57	51	56	42	34
Spec. Humidity	lb water / lb air	0.009400	0.008494	0.009971	0.009899	0.009349	0.008332
Date	mm/dd/yy	03/16/11	03/16/11	03/16/11	03/17/11	03/17/11	03/17/11
Load Designator		Base	Base	Base	Base w/DB	Base w/DB	Base w/DB
Comb. Inlet Pres.	psig	272.1	270.0	268.2	271.1	268.9	266.3
NH_3 Injection Rate	gpm	241.2	237.6	234.3	265.4	257.0	252.6
Turbine Fuel Flow	lb/min	1,859	1,842	1,823	1,841	1,818	1,811
Duct Burner Fuel Flow	lb/min	3	3	2	127	173	173
Total Fuel Flow	SCFH	2,604,564	2,581,108	2,554,085	2,753,997	2,785,350	2,776,227
Stack Moisture	% Method 4	9.1	9.3	9.4	10.1	10.1	9.9
Heat Input	MMBtu/hr	2320.6	2299.7	2275.6	2370.1	2397.1	2389.2
Power Output	megawatts	252.2	248.8	246.1	251.3	247.9	244.4

UNIT OPERATION PARAMETERS

Base Load

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
16-Mar-11 09:47:00	273.63	114.03	0.17	254.49	259.20
16-Mar-11 09:48:00	273.65	111.95	0.17	254.01	260.98
16-Mar-11 09:49:00	273.73	110.09	0.17	254.02	260.61
16-Mar-11 09:50:00	273.66	112.21	0.17	254.58	255.03
16-Mar-11 09:51:00	273.64	114.31	0.17	254.17	253.05
16-Mar-11 09:52:00	273.39	110.18	0.17	253.88	255.44
16-Mar-11 09:53:00	273.33	110.76	0.17	254.16	257.32
16-Mar-11 09:54:00	273.21	114.27	0.17	254.24	252.90
16-Mar-11 09:55:00	273.31	111.47	0.17	253.35	250.83
16-Mar-11 09:56:00	273.28	110.69	0.17	254.13	248.92
16-Mar-11 09:57:00	273.22	114.30	0.17	253.84	249.65
16-Mar-11 09:58:00	273.21	111.18	0.17	253.19	249.87
16-Mar-11 09:59:00	273.05	112.70	0.17	253.90	247.28
16-Mar-11 10:00:00	272.90	112.09	0.17	253.43	244.95
16-Mar-11 10:01:00	272.89	109.69	0.17	253.24	247.22
16-Mar-11 10:02:00	272.40	111.28	0.17	253.16	243.84
16-Mar-11 10:03:00	272.17	112.78	0.17	252.57	245.92
16-Mar-11 10:04:00	272.16	109.75	0.17	252.23	239.81
16-Mar-11 10:05:00	272.22	113.34	0.17	252.91	236.20
16-Mar-11 10:06:00	272.34	111.43	0.17	252.40	237.49
16-Mar-11 10:07:00	272.39	111.96	0.17	252.86	239.05
16-Mar-11 10:08:00	272.20	113.62	0.17	252.17	240.08
16-Mar-11 10:09:00	272.34	109.65	0.17	251.91	237.76
16-Mar-11 10:10:00	272.22	110.92	0.17	252.82	236.47
16-Mar-11 10:11:00	272.02	113.55	0.17	252.22	237.58
16-Mar-11 10:12:00	271.90	111.18	0.17	251.35	239.99
16-Mar-11 10:13:00	272.04	109.59	0.17	251.52	238.52
16-Mar-11 10:14:00	272.20	113.27	0.17	252.65	232.24
16-Mar-11 10:15:00	272.09	111.91	0.17	251.69	234.00
16-Mar-11 10:16:00	272.18	109.76	0.17	252.05	235.00
16-Mar-11 10:17:00	271.78	111.76	0.17	252.42	239.08
16-Mar-11 10:18:00	271.73	112.78	0.17	251.29	235.63
16-Mar-11 10:19:00	271.81	110.55	0.17	251.47	238.08
16-Mar-11 10:20:00	271.92	113.54	0.17	252.36	236.03
16-Mar-11 10:21:00	271.92	112.83	0.17	251.78	237.91
16-Mar-11 10:22:00	271.77	109.79	0.17	251.90	238.38
16-Mar-11 10:23:00	271.67	111.67	0.17	251.66	239.20
16-Mar-11 10:24:00	271.57	113.03	0.17	251.73	238.15
16-Mar-11 10:25:00	271.60	112.48	0.17	251.27	235.13
16-Mar-11 10:26:00	271.49	111.30	0.17	251.05	235.44
16-Mar-11 10:27:00	271.48	109.28	0.17	250.80	234.85
16-Mar-11 10:28:00	271.47	109.09	0.17	251.05	235.67
16-Mar-11 10:29:00	271.42	109.21	0.17	250.94	233.18
16-Mar-11 10:30:00	271.27	109.28	0.17	250.87	237.76
16-Mar-11 10:31:00	271.18	109.13	0.17	250.58	237.54
16-Mar-11 10:32:00	271.27	109.95	0.17	250.71	234.41
16-Mar-11 10:33:00	271.43	111.87	0.17	251.64	230.18
16-Mar-11 10:34:00	271.36	113.45	0.17	252.01	230.83
16-Mar-11 10:35:00	271.43	112.64	0.17	251.29	239.26
16-Mar-11 10:36:00	271.57	112.36	0.17	250.75	239.23
16-Mar-11 10:37:00	271.53	110.62	0.17	250.77	235.06
16-Mar-11 10:38:00	271.68	109.36	0.17	251.06	234.92
16-Mar-11 10:39:00	271.57	111.28	0.17	251.28	237.05
16-Mar-11 10:40:00	271.36	111.98	0.17	251.47	234.07
16-Mar-11 10:41:00	271.38	110.88	0.17	250.83	242.72
16-Mar-11 10:42:00	271.37	113.16	0.17	251.17	239.11
16-Mar-11 10:43:00	271.28	112.87	0.17	250.88	239.55
16-Mar-11 10:44:00	271.28	109.18	0.17	250.46	238.55
16-Mar-11 10:45:00	271.34	109.79	0.17	251.21	238.70
16-Mar-11 10:46:00	271.22	111.99	0.17	251.61	240.87
Average	272.14	111.52	0.17	252.19	241.23

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
16-Mar-11 11:03:00	270.75	111.17	0.16	249.90	239.49
16-Mar-11 11:04:00	270.60	112.88	0.16	250.09	235.76
16-Mar-11 11:05:00	270.41	112.82	0.16	250.11	238.08
16-Mar-11 11:06:00	270.10	110.86	0.16	249.06	238.61
16-Mar-11 11:07:00	270.21	109.02	0.16	249.27	231.15
16-Mar-11 11:08:00	270.28	112.35	0.16	249.50	230.77
16-Mar-11 11:09:00	270.51	111.85	0.16	249.35	227.21
16-Mar-11 11:10:00	270.65	108.84	0.16	249.43	230.39
16-Mar-11 11:11:00	270.53	111.28	0.16	250.39	230.48
16-Mar-11 11:12:00	270.53	112.17	0.16	250.04	233.82
16-Mar-11 11:13:00	270.28	108.94	0.16	249.78	234.15
16-Mar-11 11:14:00	270.27	112.62	0.16	249.73	235.03
16-Mar-11 11:15:00	270.28	110.48	0.16	249.01	233.79
16-Mar-11 11:16:00	270.27	111.64	0.16	249.75	230.87
16-Mar-11 11:17:00	270.09	110.02	0.16	249.03	235.70
16-Mar-11 11:18:00	270.12	110.97	0.16	249.38	235.76
16-Mar-11 11:19:00	270.34	109.59	0.16	248.60	229.27
16-Mar-11 11:20:00	270.39	111.25	0.16	250.01	226.39
16-Mar-11 11:21:00	270.41	111.13	0.16	249.09	231.56
16-Mar-11 11:22:00	270.69	109.58	0.16	249.33	231.41
16-Mar-11 11:23:00	270.66	112.40	0.16	250.01	226.94
16-Mar-11 11:24:00	270.31	109.49	0.16	249.46	236.94
16-Mar-11 11:25:00	270.19	108.91	0.16	248.92	247.13
16-Mar-11 11:26:00	269.97	112.13	0.16	249.04	240.17
16-Mar-11 11:27:00	270.19	109.02	0.16	248.52	240.36
16-Mar-11 11:28:00	270.18	111.04	0.16	249.56	239.70
16-Mar-11 11:29:00	270.02	112.42	0.15	248.75	240.84
16-Mar-11 11:30:00	269.87	108.50	0.15	248.33	242.63
16-Mar-11 11:31:00	269.90	110.98	0.15	249.11	237.79
16-Mar-11 11:32:00	269.69	111.52	0.15	248.43	240.28
16-Mar-11 11:33:00	269.69	108.64	0.15	247.76	243.05
16-Mar-11 11:34:00	269.68	111.43	0.15	248.89	239.58
16-Mar-11 11:35:00	269.53	109.00	0.15	247.75	239.43
16-Mar-11 11:36:00	269.42	110.82	0.15	247.81	242.66
16-Mar-11 11:37:00	269.50	111.79	0.15	247.27	241.40
16-Mar-11 11:38:00	269.85	108.26	0.15	248.04	235.35
16-Mar-11 11:39:00	270.10	111.89	0.15	249.13	233.65
16-Mar-11 11:40:00	270.10	111.08	0.15	248.77	240.80
16-Mar-11 11:41:00	270.13	108.72	0.15	248.78	243.25
16-Mar-11 11:42:00	269.89	111.13	0.15	249.06	242.52
16-Mar-11 11:43:00	269.86	111.79	0.15	248.35	246.04
16-Mar-11 11:44:00	269.71	108.43	0.15	248.42	240.70
16-Mar-11 11:45:00	269.69	108.54	0.15	248.19	241.97
16-Mar-11 11:46:00	269.79	111.94	0.15	248.53	240.37
16-Mar-11 11:47:00	270.01	110.67	0.15	248.27	239.33
16-Mar-11 11:48:00	269.95	108.42	0.15	248.28	243.84
16-Mar-11 11:49:00	269.73	111.99	0.15	248.82	239.78
16-Mar-11 11:50:00	269.83	110.67	0.15	247.67	243.34
16-Mar-11 11:51:00	269.70	109.63	0.15	248.79	238.68
16-Mar-11 11:52:00	269.89	111.80	0.15	248.57	241.90
16-Mar-11 11:53:00	269.77	108.34	0.15	248.42	238.46
16-Mar-11 11:54:00	269.87	110.22	0.15	249.05	239.11
16-Mar-11 11:55:00	269.95	111.20	0.15	248.29	240.05
16-Mar-11 11:56:00	269.65	108.56	0.15	248.34	236.64
16-Mar-11 11:57:00	269.58	110.86	0.15	248.28	243.59
16-Mar-11 11:58:00	269.29	111.75	0.15	247.69	237.49
16-Mar-11 11:59:00	269.26	108.08	0.15	247.44	241.02
16-Mar-11 12:00:00	269.33	111.72	0.15	247.81	236.20
16-Mar-11 12:01:00	269.30	110.22	0.15	247.72	233.03
16-Mar-11 12:02:00	269.07	108.21	0.15	247.49	241.14
Average	270.00	110.53	0.16	248.81	237.61

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
16-Mar-11 12:21:00	268.11	107.46	0.15	246.21	232.79
16-Mar-11 12:22:00	267.82	108.30	0.15	246.39	231.50
16-Mar-11 12:23:00	267.77	110.59	0.15	245.65	233.60
16-Mar-11 12:24:00	268.21	108.11	0.15	244.86	226.74
16-Mar-11 12:25:00	268.74	108.01	0.15	247.06	226.48
16-Mar-11 12:26:00	268.75	110.02	0.15	247.59	229.53
16-Mar-11 12:27:00	268.58	110.81	0.15	246.13	239.64
16-Mar-11 12:28:00	268.95	107.61	0.15	246.42	232.50
16-Mar-11 12:29:00	269.06	108.42	0.15	247.52	228.71
16-Mar-11 12:30:00	269.18	111.25	0.15	247.10	233.79
16-Mar-11 12:31:00	269.10	108.38	0.15	247.37	234.62
16-Mar-11 12:32:00	269.07	108.60	0.15	247.96	236.11
16-Mar-11 12:33:00	269.04	111.51	0.15	247.53	235.67
16-Mar-11 12:34:00	268.16	111.19	0.15	247.08	240.11
16-Mar-11 12:35:00	267.91	107.96	0.15	245.65	243.83
16-Mar-11 12:36:00	267.68	110.48	0.15	245.17	231.30
16-Mar-11 12:37:00	267.88	110.62	0.15	245.62	224.10
16-Mar-11 12:38:00	267.99	106.92	0.15	245.43	234.17
16-Mar-11 12:39:00	268.24	109.04	0.15	246.20	234.44
16-Mar-11 12:40:00	268.31	111.74	0.15	246.73	227.08
16-Mar-11 12:41:00	267.88	110.65	0.15	245.89	238.56
16-Mar-11 12:42:00	267.63	107.21	0.15	244.98	239.83
16-Mar-11 12:43:00	267.87	109.16	0.15	245.46	232.68
16-Mar-11 12:44:00	268.36	111.03	0.14	246.13	224.10
16-Mar-11 12:45:00	268.55	108.20	0.14	246.51	233.53
16-Mar-11 12:46:00	268.23	110.03	0.14	246.88	234.73
16-Mar-11 12:47:00	268.31	111.21	0.14	246.62	237.99
16-Mar-11 12:48:00	268.23	109.97	0.14	245.95	241.05
16-Mar-11 12:49:00	268.30	107.55	0.14	245.94	234.97
16-Mar-11 12:50:00	267.96	110.77	0.14	246.52	234.06
16-Mar-11 12:51:00	268.10	110.13	0.14	245.60	241.34
16-Mar-11 12:52:00	268.46	107.13	0.14	245.79	234.17
16-Mar-11 12:53:00	268.51	111.36	0.14	246.88	234.94
16-Mar-11 12:54:00	268.61	111.64	0.14	246.82	236.17
16-Mar-11 12:55:00	268.49	107.70	0.14	246.21	239.64
16-Mar-11 12:56:00	268.55	110.44	0.14	246.89	235.09
16-Mar-11 12:57:00	268.31	111.30	0.14	246.56	236.83
16-Mar-11 12:58:00	268.24	108.21	0.14	245.44	243.19
16-Mar-11 12:59:00	268.52	109.21	0.14	246.55	234.91
16-Mar-11 13:00:00	268.42	111.60	0.14	247.09	228.73
16-Mar-11 13:01:00	268.21	108.96	0.14	246.00	235.67
16-Mar-11 13:02:00	267.98	108.37	0.14	246.02	235.03
16-Mar-11 13:03:00	267.63	110.90	0.13	245.98	232.03
16-Mar-11 13:04:00	267.13	109.70	0.13	244.58	235.67
16-Mar-11 13:05:00	267.31	106.72	0.13	244.15	234.59
16-Mar-11 13:06:00	267.62	109.68	0.13	245.73	224.00
16-Mar-11 13:07:00	267.83	110.92	0.13	245.35	232.79
16-Mar-11 13:08:00	267.57	108.48	0.13	244.53	237.96
16-Mar-11 13:09:00	267.31	107.54	0.13	245.15	235.03
16-Mar-11 13:10:00	267.33	109.03	0.13	244.96	237.33
16-Mar-11 13:11:00	267.58	110.59	0.13	244.80	230.68
16-Mar-11 13:12:00	267.88	108.51	0.13	245.60	228.81
16-Mar-11 13:13:00	267.99	107.16	0.13	245.67	237.86
16-Mar-11 13:14:00	267.89	110.53	0.13	245.77	238.05
16-Mar-11 13:15:00	267.93	108.59	0.13	245.50	232.68
16-Mar-11 13:16:00	268.18	107.70	0.13	246.23	233.70
16-Mar-11 13:17:00	268.15	111.05	0.13	246.63	233.01
16-Mar-11 13:18:00	267.93	109.92	0.13	245.70	237.21
16-Mar-11 13:19:00	267.89	107.45	0.13	244.96	238.40
16-Mar-11 13:20:00	267.85	109.73	0.13	246.24	232.74
Average	268.15	109.38	0.14	246.07	234.27

UNIT OPERATION PARAMETERS

Base Load with Duct Burners

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
17-Mar-11 10:05:00	272.26	113.96	10.75	253.62	279.35
17-Mar-11 10:06:00	272.29	112.52	10.75	253.72	284.76
17-Mar-11 10:07:00	272.19	111.86	10.75	253.53	282.42
17-Mar-11 10:08:00	271.96	110.85	10.75	253.18	284.92
17-Mar-11 10:09:00	272.04	109.86	10.75	253.31	278.21
17-Mar-11 10:10:00	272.07	109.63	10.75	253.18	280.08
17-Mar-11 10:11:00	272.07	109.28	10.75	252.68	278.94
17-Mar-11 10:12:00	272.07	108.55	10.75	252.63	277.09
17-Mar-11 10:13:00	272.08	108.54	10.75	252.54	281.70
17-Mar-11 10:14:00	271.93	110.02	10.75	253.07	281.26
17-Mar-11 10:15:00	271.85	110.13	10.75	252.79	278.03
17-Mar-11 10:16:00	271.84	110.01	10.75	252.62	277.50
17-Mar-11 10:17:00	271.77	109.81	10.75	252.07	277.15
17-Mar-11 10:18:00	271.82	110.13	10.75	252.32	274.97
17-Mar-11 10:19:00	271.72	110.13	10.75	252.66	270.95
17-Mar-11 10:20:00	271.60	110.57	10.75	252.19	273.45
17-Mar-11 10:21:00	271.48	110.64	10.75	251.94	272.32
17-Mar-11 10:22:00	271.36	111.29	10.75	251.84	270.10
17-Mar-11 10:23:00	271.45	111.35	10.75	251.84	263.27
17-Mar-11 10:24:00	271.43	111.02	10.75	252.23	261.58
17-Mar-11 10:25:00	271.33	110.18	10.75	251.82	265.75
17-Mar-11 10:26:00	271.24	109.75	10.74	251.32	264.85
17-Mar-11 10:27:00	271.27	110.48	10.74	251.45	265.66
17-Mar-11 10:28:00	271.20	111.33	10.74	251.85	264.76
17-Mar-11 10:29:00	271.29	111.42	10.74	251.51	269.57
17-Mar-11 10:30:00	271.23	111.47	10.74	251.23	264.88
17-Mar-11 10:31:00	271.24	111.25	10.74	251.52	261.29
17-Mar-11 10:32:00	271.25	110.83	10.74	251.83	259.49
17-Mar-11 10:33:00	271.18	109.82	10.74	251.11	262.75
17-Mar-11 10:34:00	271.11	110.84	10.74	251.11	263.40
17-Mar-11 10:35:00	271.08	111.38	10.74	250.61	264.05
17-Mar-11 10:36:00	271.10	111.33	10.74	251.26	257.70
17-Mar-11 10:37:00	271.02	112.85	3.22	251.17	261.93
17-Mar-11 10:38:00	270.81	116.10	0.41	253.07	241.19
17-Mar-11 10:39:00	270.64	108.62	0.43	249.82	238.08
17-Mar-11 10:40:00	271.44	107.18	0.41	251.51	239.05
17-Mar-11 10:41:00	271.13	107.88	0.36	250.34	249.42
17-Mar-11 10:42:00	271.25	106.53	0.38	251.26	250.24
17-Mar-11 10:43:00	270.37	108.63	0.37	250.11	249.62
17-Mar-11 10:44:00	270.96	107.85	0.36	250.19	247.77
17-Mar-11 10:45:00	270.81	107.36	0.89	249.78	252.44
17-Mar-11 10:46:00	270.59	107.35	1.33	249.30	250.15
17-Mar-11 10:47:00	270.13	121.82	1.30	251.41	251.48
17-Mar-11 10:48:00	270.81	107.12	1.35	250.95	253.56
17-Mar-11 10:49:00	270.55	107.10	1.42	249.11	257.76
17-Mar-11 10:50:00	271.04	107.54	2.56	249.73	259.70
17-Mar-11 10:51:00	270.23	118.35	3.44	250.75	254.09
17-Mar-11 10:52:00	270.85	106.70	4.15	250.13	260.46
17-Mar-11 10:53:00	270.84	105.52	5.21	250.23	264.83
17-Mar-11 10:54:00	270.74	107.43	5.72	250.71	268.16
17-Mar-11 10:55:00	270.15	120.15	5.85	251.53	266.25
17-Mar-11 10:56:00	270.54	105.97	5.99	250.10	268.57
17-Mar-11 10:57:00	270.15	106.34	6.12	248.65	268.39
17-Mar-11 10:58:00	269.95	112.95	6.95	248.98	270.33
17-Mar-11 10:59:00	270.05	119.67	7.82	251.67	266.78
17-Mar-11 11:00:00	270.57	104.45	8.65	250.21	268.81
17-Mar-11 11:01:00	269.58	119.93	9.35	250.11	270.95
17-Mar-11 11:02:00	270.28	106.20	9.70	249.76	269.07
17-Mar-11 11:03:00	270.08	114.31	10.05	250.77	265.62
17-Mar-11 11:04:00	270.29	105.86	10.14	248.53	267.10
Average	271.13	110.47	7.63	251.34	265.40

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
17-Mar-11 11:25:00	270.01	106.31	10.25	250.31	262.90
17-Mar-11 11:26:00	269.64	104.43	10.26	247.66	263.49
17-Mar-11 11:27:00	269.45	106.30	10.26	248.53	266.93
17-Mar-11 11:28:00	269.52	103.66	10.27	247.83	269.01
17-Mar-11 11:29:00	269.67	105.99	10.27	247.76	258.29
17-Mar-11 11:30:00	269.89	106.58	10.28	249.17	262.42
17-Mar-11 11:31:00	269.64	105.68	10.28	247.44	260.28
17-Mar-11 11:32:00	269.40	113.71	10.29	250.63	262.81
17-Mar-11 11:33:00	269.31	110.86	10.29	250.03	267.45
17-Mar-11 11:34:00	269.40	104.10	10.30	248.10	268.78
17-Mar-11 11:35:00	269.02	104.29	10.30	247.72	264.88
17-Mar-11 11:36:00	269.02	118.80	10.31	248.63	262.34
17-Mar-11 11:37:00	269.49	105.56	10.32	247.76	259.64
17-Mar-11 11:38:00	269.52	113.40	10.32	249.28	263.52
17-Mar-11 11:39:00	269.24	110.11	10.33	248.87	265.55
17-Mar-11 11:40:00	269.20	106.60	10.33	248.07	258.99
17-Mar-11 11:41:00	269.34	110.00	10.34	247.98	252.65
17-Mar-11 11:42:00	268.72	111.69	10.34	248.91	252.74
17-Mar-11 11:43:00	268.37	106.91	10.35	247.31	251.50
17-Mar-11 11:44:00	268.33	108.66	10.35	246.79	247.28
17-Mar-11 11:45:00	269.00	112.28	10.36	247.70	243.31
17-Mar-11 11:46:00	269.17	111.05	10.36	249.44	242.66
17-Mar-11 11:47:00	268.94	107.08	10.37	248.44	253.62
17-Mar-11 11:48:00	268.88	108.78	10.37	247.50	256.79
17-Mar-11 11:49:00	269.07	112.48	10.38	248.12	251.35
17-Mar-11 11:50:00	269.14	111.65	10.39	248.70	252.27
17-Mar-11 11:51:00	269.08	107.24	10.39	248.06	255.26
17-Mar-11 11:52:00	269.18	107.57	10.40	247.69	253.53
17-Mar-11 11:53:00	269.00	111.53	10.40	247.34	254.64
17-Mar-11 11:54:00	268.88	112.46	10.41	248.80	250.12
17-Mar-11 11:55:00	268.85	108.38	10.41	247.95	253.12
17-Mar-11 11:56:00	268.89	106.52	10.41	247.18	252.75
17-Mar-11 11:57:00	268.91	110.28	10.41	247.40	251.83
17-Mar-11 11:58:00	268.42	113.01	10.41	248.48	254.16
17-Mar-11 11:59:00	268.48	109.07	10.41	247.75	257.97
17-Mar-11 12:00:00	268.72	106.27	10.41	246.58	251.81
17-Mar-11 12:01:00	268.87	111.12	10.41	247.91	244.81
17-Mar-11 12:02:00	268.70	112.87	10.41	248.68	255.12
17-Mar-11 12:03:00	268.46	109.31	10.41	247.87	263.35
17-Mar-11 12:04:00	268.49	106.96	10.41	246.98	260.38
17-Mar-11 12:05:00	268.52	107.78	10.41	247.18	251.01
17-Mar-11 12:06:00	268.47	109.81	10.41	246.79	260.20
17-Mar-11 12:07:00	268.40	112.04	10.41	247.04	261.96
17-Mar-11 12:08:00	268.42	110.69	10.41	247.87	251.65
17-Mar-11 12:09:00	268.46	108.73	10.40	247.73	256.44
17-Mar-11 12:10:00	268.42	108.20	10.40	247.49	259.76
17-Mar-11 12:11:00	268.35	107.61	10.40	247.15	254.88
17-Mar-11 12:12:00	268.43	106.90	10.40	247.24	255.28
17-Mar-11 12:13:00	268.47	106.60	10.40	247.10	255.31
17-Mar-11 12:14:00	268.68	108.63	10.40	246.92	259.99
17-Mar-11 12:15:00	268.59	111.28	10.40	247.27	258.99
17-Mar-11 12:16:00	268.48	112.02	10.40	247.21	258.94
17-Mar-11 12:17:00	268.36	110.60	10.40	247.47	260.57
17-Mar-11 12:18:00	268.48	107.18	10.40	247.34	256.12
17-Mar-11 12:19:00	268.35	106.76	10.40	247.09	255.76
17-Mar-11 12:20:00	268.44	108.28	10.40	246.22	257.76
17-Mar-11 12:21:00	268.24	112.14	10.40	247.31	252.83
17-Mar-11 12:22:00	268.25	112.60	10.40	247.69	256.28
17-Mar-11 12:23:00	268.14	109.99	10.40	247.23	259.85
17-Mar-11 12:24:00	268.15	107.07	10.40	246.59	254.93
Average	268.86	109.07	10.37	247.85	256.98

	Combustor Inlet Pressure A psig	CT A FG Flow KPPH	DB A FG Flow KPPH	CT A Load MW	Ammonia Mass Flow CT A PPH
17-Mar-11 12:43:00	266.47	105.64	10.40	243.09	258.00
17-Mar-11 12:44:00	267.07	108.70	10.39	244.13	237.99
17-Mar-11 12:45:00	267.81	110.54	10.39	245.70	243.54
17-Mar-11 12:46:00	267.84	111.45	10.39	246.79	253.82
17-Mar-11 12:47:00	267.26	107.47	10.39	247.01	265.01
17-Mar-11 12:48:00	266.72	106.36	10.39	244.99	281.41
17-Mar-11 12:49:00	266.44	107.42	10.39	243.90	274.03
17-Mar-11 12:50:00	266.70	107.95	10.39	244.15	264.60
17-Mar-11 12:51:00	266.64	106.93	10.39	244.58	262.70
17-Mar-11 12:52:00	267.13	108.76	10.39	244.18	254.94
17-Mar-11 12:53:00	267.39	110.46	10.39	245.08	249.36
17-Mar-11 12:54:00	267.24	111.47	10.39	246.53	245.89
17-Mar-11 12:55:00	267.47	109.72	10.39	246.15	259.27
17-Mar-11 12:56:00	266.88	108.86	10.39	245.31	257.00
17-Mar-11 12:57:00	267.00	106.91	10.39	245.21	252.21
17-Mar-11 12:58:00	266.87	106.02	10.39	244.39	253.38
17-Mar-11 12:59:00	267.14	109.56	10.39	244.57	246.98
17-Mar-11 13:00:00	267.11	111.15	10.39	245.50	244.98
17-Mar-11 13:01:00	267.51	110.97	10.39	246.40	245.84
17-Mar-11 13:02:00	267.30	110.87	10.39	246.02	252.22
17-Mar-11 13:03:00	267.26	108.70	10.39	245.33	257.79
17-Mar-11 13:04:00	267.29	109.39	10.39	245.81	247.45
17-Mar-11 13:05:00	266.98	106.34	10.39	245.34	255.97
17-Mar-11 13:06:00	266.79	106.23	10.39	244.74	256.94
17-Mar-11 13:07:00	266.64	106.42	10.39	244.35	257.12
17-Mar-11 13:08:00	266.50	107.76	10.39	244.09	257.98
17-Mar-11 13:09:00	266.22	108.94	10.39	244.44	256.53
17-Mar-11 13:10:00	265.38	110.57	10.39	244.16	257.47
17-Mar-11 13:11:00	264.95	109.39	10.39	242.19	265.49
17-Mar-11 13:12:00	265.01	109.85	10.39	242.38	246.63
17-Mar-11 13:13:00	265.46	109.97	10.39	243.75	234.97
17-Mar-11 13:14:00	266.30	109.98	10.39	243.99	239.04
17-Mar-11 13:15:00	266.36	110.05	10.38	244.65	233.68
17-Mar-11 13:16:00	266.45	109.15	10.38	245.43	247.75
17-Mar-11 13:17:00	265.93	108.93	10.38	245.16	258.55
17-Mar-11 13:18:00	266.12	105.44	10.38	242.38	266.07
17-Mar-11 13:19:00	266.35	105.31	10.38	243.42	246.13
17-Mar-11 13:20:00	266.29	106.00	10.38	244.06	248.87
17-Mar-11 13:21:00	266.29	106.00	10.38	244.56	257.53
17-Mar-11 13:22:00	265.32	107.73	10.38	244.14	268.04
17-Mar-11 13:23:00	265.56	107.11	10.38	241.80	276.53
17-Mar-11 13:24:00	264.81	107.90	10.38	242.58	246.86
17-Mar-11 13:25:00	265.51	109.19	10.38	242.93	251.03
17-Mar-11 13:26:00	265.11	110.17	10.38	243.64	249.33
17-Mar-11 13:27:00	265.55	109.92	10.38	242.92	249.71
17-Mar-11 13:28:00	266.37	110.16	10.38	243.34	238.32
17-Mar-11 13:29:00	266.39	110.57	10.38	244.51	240.50
17-Mar-11 13:30:00	266.44	110.85	10.38	244.99	253.91
17-Mar-11 13:31:00	265.84	110.38	10.38	244.51	259.17
17-Mar-11 13:32:00	265.64	109.23	10.38	243.53	258.99
17-Mar-11 13:33:00	265.09	108.70	10.38	243.24	248.86
17-Mar-11 13:34:00	265.51	108.10	10.38	243.55	238.64
17-Mar-11 13:35:00	266.37	107.64	10.38	243.93	239.68
17-Mar-11 13:36:00	265.73	108.60	10.38	244.23	240.05
17-Mar-11 13:37:00	266.49	107.86	10.38	244.73	243.87
17-Mar-11 13:38:00	265.73	108.77	10.38	244.90	248.95
17-Mar-11 13:39:00	265.42	108.64	10.38	243.75	254.47
17-Mar-11 13:40:00	265.11	108.09	10.38	242.75	258.32
17-Mar-11 13:41:00	265.59	109.59	10.38	243.80	242.49
17-Mar-11 13:42:00	265.31	109.02	10.38	244.30	251.52
Average	266.32	108.66	10.39	244.37	252.57

APPENDIX C

CALIBRATION GAS CERTIFICATIONS

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

P.O. No.: 11010210
Document # : 40522095-002

Customer
AIR HYGIENE INTERNATIONAL

MIKE SCOTT
5634 S 122ND E AVE
TULSA OK 74146
US

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: AAL191 **Certification Date:** 15Feb2011 **Exp. Date:** 16Aug2011
Cylinder Pressure*:** 1950 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	4.89	PPM	+/- 1%	Direct NIST and VSL
CARBON MONOXIDE	4.92	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	4.93	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	15Aug2013	KAL003004	19.83	PPM	NITRIC OXIDE
NTRM 2635	05May2016	KAL003163	25.21	PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
ECO PHYSICS/CLD 84M/84M0359	07Feb2011	CHEMI
SIEMENS I/ULTRAMAT 6E/N1-VN-0545	25Jan2011	NDIR

ANALYZER READINGS

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

First Triad Analysis	Second Triad Analysis	Calibration Curve
NITRIC OXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=19.83000 T1=4.85900	Z1=0.00000 R1=19.72000 T1=4.83700	r=0.9999
R2=19.84000 Z2=0.00000 T2=4.86000	R2=19.73000 Z2=0.00000 T2=4.83400	Constants: A=0.036017895
Z3=0.00000 T3=4.85700 R3=19.84000	Z3=0.00000 T3=4.83100 R3=19.73000	B=0.999152579 C=0
Avg. Concentration: 4.889 PPM	Avg. Concentration: 4.891 PPM	D=0 E=0
CARBON MONOXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Ox3+Ex4
Z1=0.00000 R1=25.40000 T1=4.60000	Z1=0.00000 R1=25.21000 T1=4.61000	r=0.9999
R2=25.40000 Z2=0.00000 T2=4.60000	R2=25.21000 Z2=0.00000 T2=4.61000	Constants: A=0.02020944
Z3=0.00000 T3=4.60000 R3=25.40000	Z3=0.00000 T3=4.61000 R3=25.21000	B=1.096985091 C=-0.0077427
Avg. Concentration: 4.898 PPM	Avg. Concentration: 4.944 PPM	D=0.000148781 E=0

Special Notes: AH070

APPROVED BY: ______________________
HILARY THATCHER

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: 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
	02Oct2010	KAL003166	25.21 PPM	CARBON MONOXIDE
NTRM 2629	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	Second Triad Analysis	Calibration Curve
CARBON MONOXIDE		
Date: 14Apr2010 Response Unit:PPM	Date: 21Apr2010 Response Unit: PPM	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=-0.05307 R1=25.30663 T1=12.10338	Z1=-0.06291 R1=25.26965 T1=12.17129	r=9.99986E-1
R2=25.31267 Z2=-0.05306 T2=12.12388	R2=25.30621 Z2=-0.02751 T2=12.19590	Constants: A=0.00000E+0
Z3=-0.03830 T3=12.14423 R3=25.34334	Z3=0.02191 T3=12.19939 R3=25.34779	B=8.81389E-1 C=5.84000E-4
Avg. Concentration: 12.09 PPM	Avg. Concentration: 12.15 PPM	D=1.00000E-6 E=0.00000E+0
NITRIC OXIDE		
Date: 14Apr2010 Response Unit:MV	Date: 21Apr2010 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=20.33000 T1=12.05000	Z1=0.00000 R1=20.29000 T1=11.96000	r=0.999989
R2=20.35000 Z2=0.00000 T2=12.05000	R2=20.28000 Z2=0.00000 T2=11.96000	Constants: A=0.052499
Z3=0.00000 T3=12.05000 R3=20.34000	Z3=0.00000 T3=11.96000 R3=20.29000	B=0.998591 C=0.000000
Avg. Concentration: 12.11 PPM	Avg. Concentration: 12.04 PPM	D=0.000000 E=0.000000

Special Notes: AH072 Lot Number: 0586916005

APPROVED BY: ______________________
Rob. McCrandall

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

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

P.O. No.: ALAS-55510
Project No.: 05-86523-002

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: 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

First Triad Analysis

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 %	

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999989193

Constants:	A=-0.00227705
B=0.142642211	C=-0.0004667
D=0.0000133988	E=0

OXYGEN

First Triad Analysis

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 %	

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.9999996862

Constants:	A=-0.0380151
B=1.001181065	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		Customer
	P.O. No.: ALAS-56936	AIR LIQUIDE AMERICA L.P.
AIR LIQUIDE AMERICA SPECIALTY GASES LLC	Project No.: 05-88735-006	AIR HYGIENE
1290 COMBERMERE STREET		1319 NORTH PEORIA AVE
TROY, MI 48083		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=90.60000	R3=100.0000

Avg. Concentration: 19.07 %

Concentration=A+Bx+Cx2+Dx3+Ex4

r=0.999986

Constants:	A=-0.00585731
B=0.131065652	C=-0.0001375
D=1.12705E-06	E=0

OXYGEN

Date: 21Jun2010 Response Unit:%

Z1=0.00000	R1=23.20000	T1=21.16000
R2=23.20000	Z2=0.00000	T2=21.16000
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™

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: CC103445

Customer: AIR HYGIENE
Location: TULSA, OK

P.O. Number: 9041201
Item Number: SGZCAH001

Shipping Order Number: 33223677
Transfer Number: 33223677
Lot Number: SFS131505
Valve: CGA 350
Cylinder Pressure*: 2000 PSIG
*Cylinder should not be used when gas pressure is below 150 psig

Assay Date: 30-Apr-2009
Expiration Date: 30-Apr-2012

Components	Requested Concentration	Assay Concentration
Nitrogen	**Balance**	**Balance**
Methane	**3 ppm**	**2.89 ± 0.03 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 ·30-Apr-2009				
Analyzer Information			Trial 1	Trial 2	Trial 3	Units	
Analyzer Type:	Gas Chromatograph	Zero	0.000	0.000	0.000	Area	
Manufacturer:	Hewlett Packard	Reference	97.31	97.29	97.20	Area	
Model Number:	G1540A	Candidate	27.99	27.97	27.96	Area	
Serial Number:	US00003390/Meth	Result	2.894	2.892	2.894	ppm	
MPR Last Calibrated:	23-Apr-2009	Evaluation	Valid	Valid	Valid		
Analytical Principle:	FID & TCD				Mean Analytical Result:	2.893	ppm

Analyst: ______ Eric Barron

Approved by: ______ 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

P.O. Number: 9032901
Item Number: SGZCAH002

Assay Date: 24-Apr-2009

Expiration Date: 24-Apr-2012

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

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				
Analyzer Information			Trial 1	Trial 2	Trial 3	Units
Analyzer Type:	Gas Chromatograph	Zero	0.000	0.000	0.000	Area
Manufacturer:	Hewlett Packard	Reference	97.22	97.24	97.24	Area
Model Number:	G1540A	Candidate	45.95	45.92	46.03	Area
Serial Number:	US00003390/Meth	Result	4.755	4.751	4.762	ppm
MPR Last Calibrated:	23-Apr-2009	Evaluation	Valid	Valid	Valid	
Analytical Principle:	FID & TCD			Mean Analytical Result:	4.756	ppm

Analyst: ______________________ Eric Barron

Approved by: ______________________ Jason Unger

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.: 9081310
AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 05-79607-014
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: 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+Cx2+Dx3+Ex4
r=0.999995113

Constants:	A=0.11264489
B=0.000109556	C=0
D=0	E=0

APPROVED BY:
ROBERT LESNIAK

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott™

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

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
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

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

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
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. NO_2 to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO_2 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:	March 16-17, 2011
Company:	Florida Power and Light
Location:	Loxahatchee, Florida
Techs:	PS/SB

Sample System Leak Check

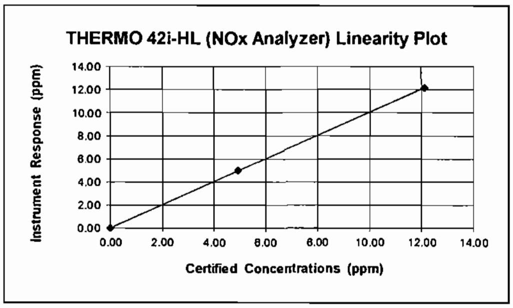
Date	Sample System	Leak Rate (l/min)
March 16-17, 2011	1	0

Calibration Date: March 16, 2011
Client: Florida Power and Light

NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)

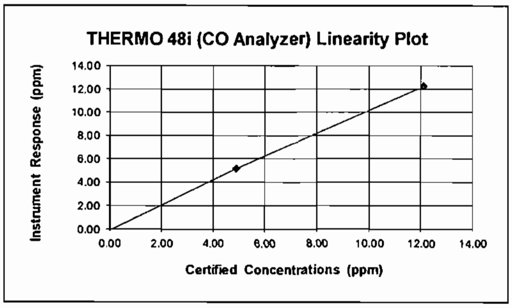
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.04	0.33	0.04	YES (%)
4.93	5.00	0.58	0.07	YES (%)
12.10	12.17	0.58	0.07	YES (%)
Linearity = 0.998				


THERMO 42i-HL (NOx Analyzer) Linearity Plot

CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)

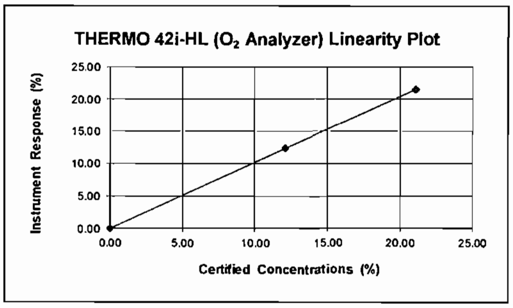
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	-0.10	-0.83	0.10	YES (%)
4.89	5.16	2.23	0.27	YES (abs)
12.10	12.22	0.99	0.12	YES (%)
Linearity = 0.984				


THERMO 48i (CO Analyzer) Linearity Plot

O_2 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	0.01	0.05	0.01	YES (%)
12.10	12.39	1.37	0.29	YES (%)
21.10	21.57	2.23	0.47	YES (abs)
Linearity = 0.979				

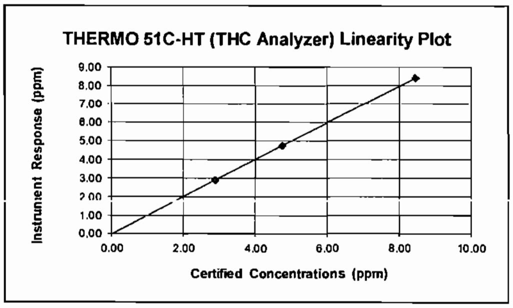

THERMO 42i-HL (O_2 Analyzer) Linearity Plot

THC Range (ppm) = 10.5

THERMO 51C-HT (THC Analyzer)

Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail ($\pm$2,5%)[1]
0.00	-0.02	-0.19	N/A	YES
2.89	2.91	1.62	2.86	YES
4.76	4.76	0.66	4.73	YES
8.46	8.42	-0.38	N/A	YES
Linearity = 1.011				

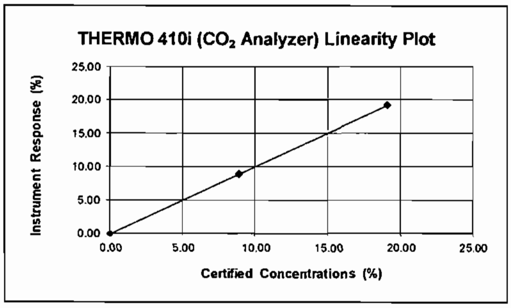
[1]-zero/high based on 2% of span,low/mid based on 5% of concentration


THERMO 51C-HT (THC Analyzer) Linearity Plot

CO_2 Span (%) = 19.10

THERMO 410i (CO_2 Analyzer)

Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.02	0.10	0.02	YES (%)
8.91	8.91	0.00	0.00	YES (%)
19.10	19.17	0.37	0.07	YES (%)
Linearity = 0.997				


THERMO 410i (CO_2 Analyzer) Linearity Plot

NOx Converter Efficiency

Date: March 16, 2011
Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**2.29**
	Analyzer Reading, NOx Channel, ppmvd	**46.76**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**44.47**
	Converter Efficiency, %	**92.26**

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.

$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V} \right) \times 100 \qquad \text{Eq. 7E-7} = \frac{44.47 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 92.26\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/16/11 07:01:26	1020	9.72	4.66
03/16/11 07:01:56	1050	34.26	3.23
03/16/11 07:02:26	1080	43.88	2.78
03/16/11 07:02:56	1110	45.57	2.52
03/16/11 07:03:26	1140	46.29	2.36
03/16/11 07:03:56	***1170***	***46.76***	***2.29***
03/16/11 07:04:26	1200	38.01	1.89

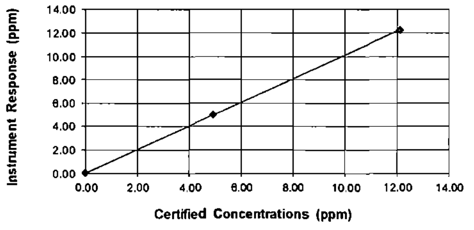
Calibration Date: March 17, 2011
Client: Florida Power and Light

NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.04	0.33	0.04	YES (%)
4.93	5.02	0.74	0.09	YES (%)
12.10	12.25	1.24	0.15	YES (%)

Linearity = 0.991

THERMO 42i-HL (NOx Analyzer) Linearity Plot

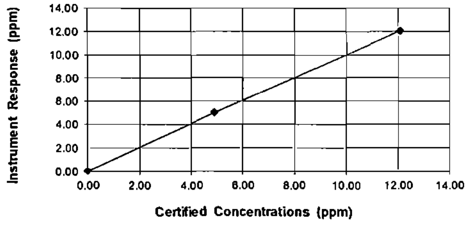


CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.05	0.41	0.05	YES (%)
4.89	5.04	1.24	0.15	YES (%)
12.10	12.04	-0.50	0.06	YES (%)

Linearity = 1.011

THERMO 48i (CO Analyzer) Linearity Plot

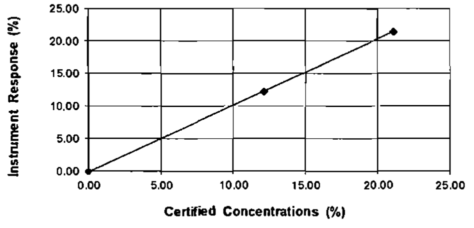


O2 Span (%) = 21.10

THERMO 42i-HL (O_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.01	0.05	0.01	YES (%)
12.10	12.18	0.38	0.08	YES (%)
21.10	21.40	1.42	0.30	YES (%)

Linearity = 0.987

THERMO 42i-HL (O_2 Analyzer) Linearity Plot



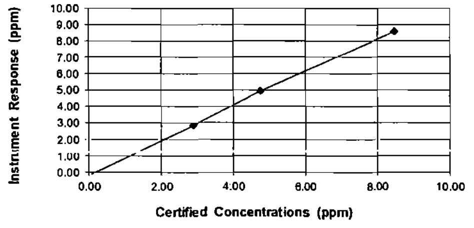
THC Range (ppm) = 10.5

THERMO 51C-HT (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2,5%)[1]
0.00	-0.15	-1.43	N/A	YES
2.89	2.85	0.61	2.83	YES
4.76	4.95	3.95	4.76	YES
8.46	8.58	1.14	N/A	YES

Linearity = 0.977

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

THERMO 51C-HT (THC Analyzer) Linearity Plot

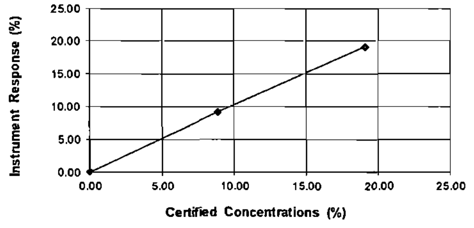


CO2 Span (%) = 19.10

THERMO 410i (CO_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.08	0.42	0.08	YES (%)
8.91	9.21	1.57	0.30	YES (%)
19.10	19.11	0.05	0.01	YES (%)

Linearity = 1.004

THERMO 410i (CO_2 Analyzer) Linearity Plot



NOx Converter Efficiency

Date: March 17, 2011

Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**1.78**
	Analyzer Reading, NOx Channel, ppmvd	**48.74**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**46.96**
	Converter Efficiency, %	**97.43**

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.

$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V}\right) \times 100 \quad \text{Eq. 7E-7} = \frac{46.96 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 97.43\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/17/11 07:06:07	1410	24.33	3.36
03/17/11 07:06:37	1440	44.94	1.98
03/17/11 07:07:07	1470	47.42	1.93
03/17/11 07:07:37	1500	47.99	1.89
03/17/11 07:08:07	1530	48.32	1.87
03/17/11 07:08:37	1560	48.48	1.84
03/17/11 07:09:07	1590	48.55	1.81
03/17/11 07:09:37	1620	48.66	1.80
03/17/11 07:10:07	***1650***	***48.74***	***1.78***
03/17/11 07:10:37	1680	39.63	1.45

DRIFT AND BIAS CHECK

	Strat Test Pre and Post QA/QC Check	O2	CO	NOx
	Initial Zero	0.00	0.11	0.12
	Final Zero	0.02	-0.53	0.10
	Avg. Zero	0.01	-0.21	0.11
	Initial UpScale	12.24	5.00	4.84
	Final UpScale	12.11	4.77	4.84
	Avg. UpScale	12.18	4.89	4.84
	Sys Resp (Zero)	0.01	-0.10	0.04
	Sys Resp (Upscale)	12.39	5.16	5.00
	Upscale Cal Gas	12.10	4.89	4.93
	Initial Zero Bias	-0.05%	1.74%	0.66%
	Final Zero Bias	0.05%	-3.55%	0.50%
	Zero Drift	0.09%	5.29%	0.17%
	Initial Upscale Bias	-0.71%	-1.32%	-1.32%
	Final Upscale Bias	-1.33%	-3.22%	-1.32%
	Upscale Drift	0.62%	1.90%	0.00%
Alternative Specification Abs Diff	**Initial Zero**	0.01	0.21	0.08
	Final Zero	0.01	0.43	0.06
	Initial Upscale	0.15	0.16	0.16
	Final Upscale	0.28	0.39	0.16
	Calibration Span	21.10	12.10	12.10
	3% of Range (drift)	0.63	0.36	0.36
	5% of Range (bias)	1.06	0.61	0.61

Respone Time (min)	0.7	1.3	1.3
Sys. Response (min)		1.3	

Date/Time mm/dd/yy hh:mm:ss	z	O2 %	s	z	CO ppm	s	z	NOx ppm	s	**INJECTIONS**
03/16/11 07:58:16		13.16			0.61			2.41		x
03/16/11 07:58:26		13.16			0.59			2.39		
03/16/11 07:58:36		**12.75**			0.62			2.39		
03/16/11 07:58:46		7.10			0.54			2.40		
03/16/11 07:58:56		**11.88**	x		0.44			2.23		
03/16/11 07:59:06		**12.23**		x	**0.12**			1.36		
03/16/11 07:59:16		**12.24**			**-0.01**			0.64		
03/16/11 07:59:26		**12.25**			**-0.08**			0.37		
03/16/11 07:59:36		**12.25**			-0.20		x	**0.12**		
03/16/11 07:59:46		**12.24**			-0.24			**0.10**		
03/16/11 07:59:56		**12.24**			-0.27			**0.09**		
03/16/11 08:00:06		**12.26**			-0.27			**0.09**		
03/16/11 08:00:16		**12.25**			-0.25			**0.10**		
03/16/11 08:00:26		**12.26**			-0.21			**0.09**		
03/16/11 08:00:36		**12.25**			-0.18			**0.08**		
03/16/11 08:00:46		**12.26**			-0.18			**0.07**		
03/16/11 08:00:56		**12.26**			-0.22			**0.07**		
03/16/11 08:01:06		**12.26**			-0.18			**0.07**		x
03/16/11 08:01:16		**12.25**			**-0.13**			**0.08**		
03/16/11 08:01:26		8.39			-0.21			**0.08**		
03/16/11 08:01:36	x	**0.57**			**0.30**			**0.20**		
03/16/11 08:01:46		**0.20**			1.58			0.80		
03/16/11 08:01:56		**0.16**			3.03			1.54		
03/16/11 08:02:06		**0.16**			4.04			3.22		
03/16/11 08:02:16		**0.13**			4.61			**4.66**	x	
03/16/11 08:02:26		**0.14**			**4.91**	x		**4.75**		
03/16/11 08:02:36		**0.12**			**4.90**			**4.82**		
03/16/11 08:02:46		**0.14**			**4.90**			**4.85**		
03/16/11 08:02:56		**0.11**			**4.95**			**4.86**		
03/16/11 08:03:06		**0.12**			**4.94**			**4.86**		
03/16/11 08:03:16		**0.12**			**4.96**			**4.86**		
03/16/11 08:03:26		**0.12**			**4.89**			**4.86**		
03/16/11 08:03:36		**0.11**			**4.76**			**4.86**		
03/16/11 08:03:46		**0.11**			**4.88**			**4.85**		

DRIFT AND BIAS CHECK

	Base Load, Run - 1	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.16	2.50	0.36	0.53	4.67
	Corrected Average	13.09	2.51	0.88	0.56	4.43
	Initial Zero	0.02	0.10	-0.53	0.02	0.29
	Final Zero	0.16	0.13	-0.65	-0.03	0.47
	Avg. Zero	0.09	0.12	-0.59	-0.01	0.38
	Initial UpScale	12.11	4.84	4.77	2.93	8.92
	Final UpScale	12.23	4.76	4.56	3.09	9.07
	Avg. UpScale	12.17	4.80	4.67	3.01	9.00
	Sys Resp (Zero)	0.01	0.04	-0.10	-0.02	0.02
	Sys Resp (Upscale)	12.39	5.00	5.16	2.91	8.91
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	0.05%	0.50%	-3.55%	0.38%	1.41%
	Final Zero Bias	0.71%	0.74%	-4.55%	-0.10%	2.36%
	Zero Drift	0.66%	0.25%	0.99%	0.48%	0.94%
	Initial Upscale Bias	-1.33%	-1.32%	-3.22%	0.19%	0.05%
	Final Upscale Bias	-0.76%	-1.98%	-4.96%	1.71%	0.84%
	Upscale Drift	0.57%	0.66%	1.74%	1.52%	0.79%
Alternative Specification Abs Diff	Initial Zero	0.01	0.06	0.43	--	0.27
	Final Zero	0.15	0.09	0.55	--	0.45
	Initial Upscale	0.28	0.16	0.39	--	0.01
	Final Upscale	0.16	0.24	0.60	--	0.16
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base Load, Run - 2	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.27	2.44	0.89	0.64	4.82
	Corrected Average	13.10	2.46	0.91	0.56	4.42
	Initial Zero	0.16	0.13	0.07	-0.03	0.47
	Final Zero	0.31	0.16	-0.28	0.24	0.64
	Avg. Zero	0.24	0.15	-0.11	0.11	0.56
	Initial UpScale	12.23	4.76	4.99	3.09	9.07
	Final UpScale	12.32	4.71	5.55	3.39	9.23
	Avg. UpScale	12.28	4.74	5.27	3.24	9.15
	Sys Resp (Zero)	0.01	0.04	-0.10	-0.02	0.02
	Sys Resp (Upscale)	12.39	5.00	5.16	2.91	8.91
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	0.71%	0.74%	1.40%	-0.10%	2.36%
	Final Zero Bias	1.42%	0.99%	-1.49%	2.48%	3.25%
	Zero Drift	0.71%	0.25%	2.89%	2.57%	0.89%
	Initial Upscale Bias	-0.76%	-1.98%	-1.40%	1.71%	0.84%
	Final Upscale Bias	-0.33%	-2.40%	3.22%	4.57%	1.68%
	Upscale Drift	0.43%	0.41%	4.63%	2.86%	0.84%
Alternative Specification Abs Diff	Initial Zero	0.15	0.09	0.17	--	0.45
	Final Zero	0.30	0.12	0.18	--	0.62
	Initial Upscale	0.16	0.24	0.17	--	0.16
	Final Upscale	0.07	0.29	0.39	--	0.32
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base Load, Run - 3	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.40	2.48	0.48	0.62	4.94
	Corrected Average	13.21	2.51	0.66	0.51	4.42
	Initial Zero	0.31	0.16	-0.28	0.24	0.64
	Final Zero	0.45	0.19	-0.14	0.15	0.75
	Avg. Zero	0.38	0.18	-0.21	0.20	0.70
	Initial UpScale	12.32	4.71	4.96	2.98	9.23
	Final UpScale	12.30	4.68	4.71	2.98	9.27
	Avg. UpScale	12.31	4.70	4.84	2.98	9.25
	Sys Resp (Zero)	0.01	0.04	-0.10	-0.02	0.02
	Sys Resp (Upscale)	12.39	5.00	5.16	2.91	8.91
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	1.42%	0.99%	-1.49%	2.48%	3.25%
	Final Zero Bias	2.09%	1.24%	-0.33%	1.62%	3.82%
	Zero Drift	0.66%	0.25%	1.16%	0.86%	0.58%
	Initial Upscale Bias	-0.33%	-2.40%	-1.65%	0.67%	1.68%
	Final Upscale Bias	-0.43%	-2.64%	-3.72%	0.67%	1.88%
	Upscale Drift	0.09%	0.25%	2.07%	0.00%	0.21%
Alternative Specification Abs Diff	Initial Zero	0.30	0.12	0.18	--	0.62
	Final Zero	0.44	0.15	0.04	--	0.73
	Initial Upscale	0.07	0.29	0.20	--	0.32
	Final Upscale	0.09	0.32	0.45	--	0.36
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base W/Db Load, Run - 4	O_2	NOx	CO	VOC	CO_2
	Raw Average	12.70	2.58	0.77	-0.23	4.87
	Corrected Average	12.47	2.45	0.75	0.00	4.91
	Initial Zero	0.03	0.18	0.13	-0.15	0.00
	Final Zero	0.47	0.18	-0.16	-0.27	0.17
	Avg. Zero	0.25	0.18	-0.02	-0.21	0.09
	Initial UpScale	12.12	5.06	5.28	2.64	8.80
	Final UpScale	12.54	4.96	5.01	2.61	8.76
	Avg. UpScale	12.33	5.01	5.15	2.63	8.78
	Sys Resp (Zero)	0.01	0.04	0.05	-0.15	0.08
	Sys Resp (Upscale)	12.18	5.02	5.04	2.85	9.21
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	0.09%	1.16%	0.66%	0.00%	-0.42%
	Final Zero Bias	2.18%	1.16%	-1.74%	-1.14%	0.47%
	Zero Drift	2.09%	0.00%	2.40%	1.14%	0.89%
	Initial Upscale Bias	-0.28%	0.33%	1.98%	-2.00%	-2.15%
	Final Upscale Bias	1.71%	-0.50%	-0.25%	-2.29%	-2.36%
	Upscale Drift	1.99%	0.83%	2.23%	0.29%	0.21%
Alternative Specification Abs Diff	Initial Zero	0.02	0.14	0.08	--	0.08
	Final Zero	0.46	0.14	0.21	--	0.09
	Initial Upscale	0.06	0.04	0.24	--	0.41
	Final Upscale	0.36	0.06	0.03	--	0.45
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base W/Db Load, Run - 5	O_2	NOx	CO	VOC	CO_2
	Raw Average	12.86	2.59	0.52	0.73	4.96
	Corrected Average	12.36	2.50	0.73	0.90	4.90
	Initial Zero	0.47	0.18	-0.16	-0.27	0.17
	Final Zero	0.65	0.16	-0.34	-0.05	0.28
	Avg. Zero	0.56	0.17	-0.25	-0.16	0.23
	Initial UpScale	12.54	4.96	5.01	2.96	8.76
	Final UpScale	12.65	4.92	4.73	2.98	8.92
	Avg. UpScale	12.60	4.94	4.87	2.97	8.84
	Sys Resp (Zero)	0.01	0.04	0.05	-0.15	0.08
	Sys Resp (Upscale)	12.18	5.02	5.04	2.85	9.21
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	2.18%	1.16%	-1.74%	-1.14%	0.47%
	Final Zero Bias	3.03%	0.99%	-3.22%	0.95%	1.05%
	Zero Drift	0.85%	0.17%	1.49%	2.10%	0.58%
	Initial Upscale Bias	1.71%	-0.50%	-0.25%	1.05%	-2.36%
	Final Upscale Bias	2.23%	-0.83%	-2.56%	1.24%	-1.52%
	Upscale Drift	0.52%	0.33%	2.31%	0.19%	0.84%
Alternative Specification Abs Diff	Initial Zero	0.46	0.14	0.21	--	0.09
	Final Zero	0.64	0.12	0.39	--	0.20
	Initial Upscale	0.36	0.06	0.03	--	0.45
	Final Upscale	0.47	0.10	0.31	--	0.29
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base W/Db Load, Run - 6	O_2	NOx	CO	VOC	CO_2
	Raw Average	12.15	2.70	0.64	0.83	5.07
	Corrected Average	12.35	2.63	0.80	0.89	4.89
	Initial Zero	0.02	0.16	-0.34	-0.05	0.28
	Final Zero	-0.29	0.09	-0.05	0.06	0.35
	Avg. Zero	-0.14	0.13	-0.20	0.01	0.32
	Initial UpScale	12.03	4.92	4.73	2.98	8.92
	Final UpScale	11.78	4.98	5.13	3.00	9.05
	Avg. UpScale	11.91	4.95	4.93	2.99	8.99
	Sys Resp (Zero)	0.01	0.04	0.05	-0.15	0.08
	Sys Resp (Upscale)	12.18	5.02	5.04	2.85	9.21
	Upscale Cal Gas	12.10	4.93	4.89	2.89	8.91
	Initial Zero Bias	0.05%	0.99%	-3.22%	0.95%	1.05%
	Final Zero Bias	-1.42%	0.41%	-0.83%	2.00%	1.41%
	Zero Drift	1.47%	0.58%	2.40%	1.05%	0.37%
	Initial Upscale Bias	-0.71%	-0.83%	-2.56%	1.24%	-1.52%
	Final Upscale Bias	-1.90%	-0.33%	0.74%	1.43%	-0.84%
	Upscale Drift	1.18%	0.50%	3.31%	0.19%	0.68%
Alternative Specification Abs Diff	Initial Zero	0.01	0.12	0.39	--	0.20
	Final Zero	0.30	0.05	0.10	--	0.27
	Initial Upscale	0.15	0.10	0.31	--	0.29
	Final Upscale	0.40	0.04	0.09	--	0.16
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

NOZZLE CALIBRATION SHEET

NOZZLE SET IDENTIFICATION: SAMP-NS-000I
CALIBRATION DATE: April 22, 2010
CALIPER NUMBER: SAMP-DC-0011
NAME OF CALIBRATOR: Jake Fahlenkamp

NOZZLE I.D.	DIAMETER	AVERAGE DIAMETER	EPA Method 5, Sec. 10.1 Criteria
I#4	0.109	0.108	PASS
	0.108		
	0.106		
I#6	0.174	0.175	PASS
	0.176		
	0.175		
I8	0.234	0.232	PASS
	0.231		
	0.232		
I#10	0.311	0.309	PASS
	0.309		
	0.308		
I#12	0.357	0.357	PASS
	0.357		
	0.356		
I#14	0.433	0.434	PASS
	0.436		
	0.434		
I#16	0.488	0.489	PASS
	0.491		
	0.489		

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693

Date: 03/04/11
Barometric Pressure: 29.85 (in. Hg)
Theoretical Critical Vacuum: 14.08 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume			Initial Temperature	
		Initial (ft^3)	Final (ft^3)	Total (ft^3)	Inlet (°F)	Outlet (°F)
0.78	17.00	91.440	100.260	8.820	84.0	79.0
1.10	12.00	100.260	107.390	7.130	77.0	77.0
1.40	10.00	107.390	114.280	6.890	75.0	75.0
2.30	10.00	114.280	123.040	8.760	75.0	75.0
3.50	10.00	123.040	133.620	10.580	75.0	74.0

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)
77.0	77.0	15	0.3865	16.0	69.6	70.0	69.8
75.0	75.0	17	0.4454	16.0	70.0	70.0	70.0
75.0	75.0	19	0.5196	16.0	70.0	70.2	70.1
75.0	74.0	25	0.6642	15.5	70.2	70.2	70.2
77.0	74.0	30	0.8090	14.5	70.0	69.8	69.9

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)
8.629	244.37	8.521	241.3	8.573
7.023	198.90	6.930	196.3	6.975
6.805	192.71	6.737	190.8	6.782
8.675	245.66	8.610	243.8	8.670
10.503	297.44	10.490	297.1	10.557

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
-0.004	0.987	1.710	43.43	-0.035
-0.004	0.987	1.823	46.31	0.078
-0.001	0.990	1.709	43.40	-0.037
0.001	0.993	1.720	43.68	-0.025
0.008	0.999	1.765	44.82	0.019
AVERAGE:	**0.991**	**1.745**	44.33	**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 dH@, the orifice differential pressure in inches of H_20 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: 03/04/11 03/04/11

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)
Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693
Date:
Barometric Pressure: 29.85 (in. Hg)
Temperature (ASTM cal): 67.90 (°F)

Thermocouple	100	(°F)	600	(°F)	1200	(°F)
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	99.00	0.50	600.00	0.00	1197.00	0.25
Probe	100.00	0.00	601.00	0.17	1197.00	0.25
Filter	100.00	0.00	601.00	0.17	1197.00	0.25
Dryer	99.00	0.50	600.00	0.00	1197.00	0.25
Aux.	99.00	0.50	600.00	0.00	1197.00	0.25

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	67.90	(°F)
	Reading	(±°F)
DGM In	68.0	0.10
DGM Out	68.0	0.10

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: Craig McCarty

DATE: 03/04/11 03/04/11

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 Assett ID(s): **Probe:** samp-hp-0052 **Hotbox:** samp-bh-0014 **Gooseneck:** samp-ad-0034

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Barometric Pressure: 29.85

Thermo-couples		Temps (°F)	Signature		Date	
Stack	Ref	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Filter	Ref	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Exit	Ref	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				

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 Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]First (3 point)

Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693

Date: 03/20/11
Barometric Pressure: 30.18 (in. Hg)
Theoretical Critical Vacuum: 14.24 (in. Hg)

DRY GAS METER READINGS

ΔH	Time	Volume			Initial Temperature	
		Initial	Final	Total	Inlet	Outlet
(in. H2O)	(min)	(ft³)	(ft³)	(ft³)	(°F)	(°F)
1.10	12.00	110.100	117.510	7.410	88.0	88.0
1.10	12.00	117.510	125.010	7.500	86.0	87.0
1.10	12.00	125.010	132.510	7.500	86.0	87.0

Final Temperature		Orifice	K' Orifice	Actual	Ambient Temperature		
Inlet (°F)	Outlet (°F)	Serial# (number)	Coefficient (see above)	Vacuum (in. Hg)	Initial (°F)	Final (°F)	Average (°F)
86.0	87.0	17	0.4454	20.0	86.0	85.0	85.5
86.0	87.0	17	0.4454	20.0	85.0	85.0	85.0
86.0	87.0	17	0.4454	20.0	85.0	86.0	85.5

RESULTS

DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (ft³)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft³)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft³)
7.228	204.69	6.906	195.6	7.077
7.326	207.46	6.910	195.7	7.073
7.326	207.46	6.906	195.6	7.077

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
0.008	0.956	1.817	46.15	-0.001
-0.004	0.943	1.817	46.15	-0.001
-0.004	0.943	1.819	46.20	0.001
AVERAGE:	**0.947**	**1.818**	46.17	**PASSED**

LAST 5-PT:	**0.991**	**1.745**	**PASSED**	5-PT Date:
% DIFF:	**4.6%**	**4.1%**		03/04/11

40 CFR - CHAPTER I - PART 60
Appendix A, Method 5
10.3.2 Calibration After Use

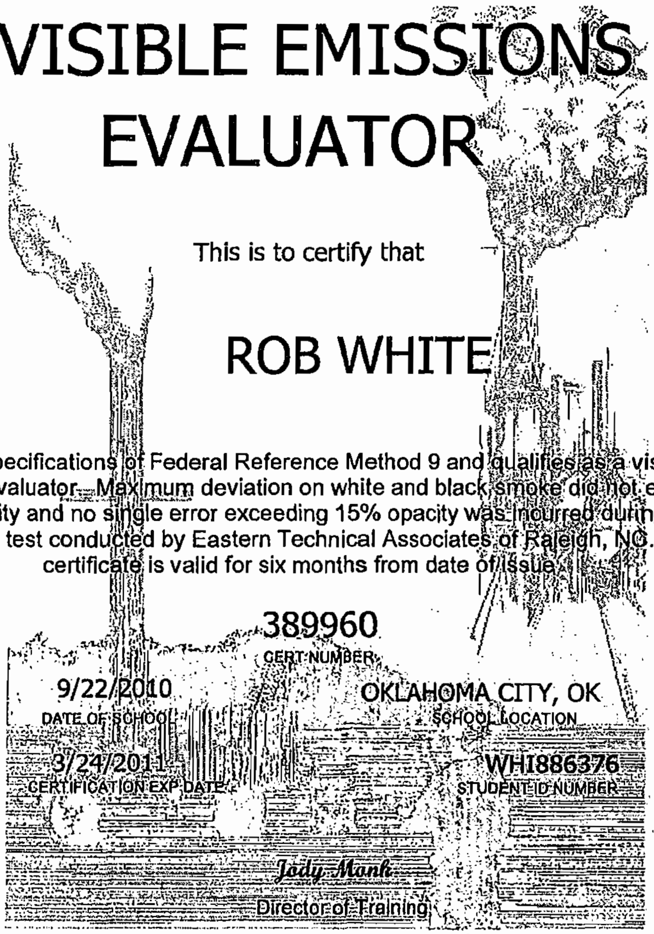
After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single, intermediate orifice setting (based on the previous field test)....Calculate the average value of the DGM calibration factor. If the value has changed by more than 5 percent, 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 dH@, the orifice differential pressure in inches of H_20 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: Thomas Graham DATE: 03/20/11



VISIBLE EMISSIONS EVALUATOR

This is to certify that

ROB WHITE

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.

389960
CERT NUMBER

9/22/2010
DATE OF SCHOOL

OKLAHOMA CITY, OK
SCHOOL LOCATION

3/24/2011
CERTIFICATION EXP DATE

WHI886376
STUDENT ID NUMBER

Jody Monk
Director of Training

EASTERN TECHNICAL ASSOCIATES

ROB WHITE

WHI886376 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	389960
SCHOOL LOCATION	DATE OF SCHOOL	CERT NUMBER
TULF06	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: March 16, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular^1 Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross^{1,3} Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net^{1,3} Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	97.644	16.0430	15.67	94.83	994.85	971.41	895.75	874.65
Ethane	C_2H_6	0.848	30.0700	0.25	1.54	1,743.15	14.78	1,594.41	13.52
Propane	C_3H_8	0.076	44.0970	0.03	0.20	2,478.35	1.88	2,280.17	1.73
iso-Butane	iC_4H_{10}	0.012	58.1230	0.01	0.04	3,203.11	0.38	2,955.38	0.35
n-Butane	nC_4H_{10}	0.008	58.1230	0.00	0.03	3,213.35	0.26	2,965.62	0.24
Iso-Pentane	iC_5H_{12}	0.000	72.1500	0.00	0.00	3,940.87	0.00	3,643.50	0.00
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.011	86.1770	0.01	0.06	4,684.54	0.52	4,337.82	0.48
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	0.952	44.0100	0.42	2.54	0.00	0.00	0.00	0.00
Nitrogen	N_2	0.449	28.0134	0.13	0.76	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**16.52**	**100.00**	**dry**	**989.23**	**dry**	**890.97**
						wet^{2,5}	**966.42**	**wet^{2,5}**	**870.43**

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.519	lb/lb-mole
Btu per lb. of gas^4 =	23,068.676	gross (HHV)
Btu per lb. of gas^4 =	20,777.371	net (LHV)
Density of fuel gas^2 =	0.0429	lb/cu. ft
Wt % VOC in fuel gas =	0.33	%
Specific Gravity^1 =	0.5704	

Component	Wt%
carbon	73.19
oxygen	1.84
hydrogen	24.20
nitrogen	0.76
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,641.06
(Based on EPA RM-19) at 68 deg F and 14.696 psia

F-Factor Calculation:

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

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

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

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

References:

[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: 1030-2011030415-001A

March 24, 2011

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

Sample ID:		Sampled By:		
Station Name :	Unit 3A W/O DB	Sample Of:	Gas	Spot
Station Number :		Sample Date:	03/16/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:		PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/23/2011 10:52:17
Nitrogen	0.449	0.761				
Carbon Dioxide	0.952	2.536				
Methane	97.644	94.824				
Ethane	0.848	1.544	0.226			
Propane	0.076	0.203	0.021			
Iso Butane	0.012	0.042	0.004			
n-Butane	0.008	0.028	0.003			
Hexanes Plus	0.011	0.062	0.005			
	100.000	100.000	0.259			

	C2 +	**C3 +**	**iC5 +**	
GPM TOTAL :	0.259	0.033	0.005	
Relative Density	Real Gas			0.5713
Calculated Molecular Weight				16.52
Compressibility Factor				0.9980

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	1006
	Saturated Basis	989

Comments :

Cylinder Number 2880

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: 1030-2011030415-001A

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

March 24, 2011

Sample ID:
Station Name: Unit 3A W/O DB
Station Number :
Location: Tulsa, OK
Sample Point:

Sampled By:
Sample Of: Gas
Sample Date: 03/16/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	1.2	PPMW	1.0	EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	0.0001	Wt%.		EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	0.038	gr/100 cu.ft.		EM	03/24/11

Comments: Cylinder Number: 2680
Sample On: 03/16/2011

Hydrocarbon Laboratory Manager

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

Client: Florida Power and Light
Location: West County Energy Center
Date: March 17, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular Weight[1] (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	94.066	16.0430	15.09	88.89	994.85	935.81	895.75	842.60
Ethane	C_2H_6	0.762	30.0700	0.23	1.35	1,743.15	13.28	1,594.41	12.15
Propane	C_3H_8	0.077	44.0970	0.03	0.20	2,478.35	1.91	2,280.17	1.76
iso-Butane	iC_4H_{10}	0.013	58.1230	0.01	0.04	3,203.11	0.42	2,955.38	0.38
n-Butane	nC_4H_{10}	0.011	58.1230	0.01	0.04	3,213.35	0.35	2,965.62	0.33
Iso-Pentane	iC_5H_{12}	0.000	72.1500	0.00	0.00	3,940.87	0.00	3,643.50	0.00
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.078	86.1770	0.07	0.40	4,684.54	3.65	4,337.82	3.38
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	0.895	44.0100	0.39	2.32	0.00	0.00	0.00	0.00
Nitrogen	N_2	4.098	28.0134	1.15	6.76	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**16.98**	**100.00**	**dry**	**955.43**	**dry**	**860.60**
						wet[2,5]	**933.40**	**wet[2,5]**	**840.76**

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.977	lb/lb-mole
Btu per lb. of gas[4] =	21,679.660	gross (HHV)
Btu per lb. of gas[4] =	19,527.947	net (LHV)
Density of fuel gas[2] =	0.0441	lb/cu. ft
Wt % VOC in fuel gas =	0.68	%
Specific Gravity[1] =	0.5862	

Component	Wt%
carbon	68.82
oxygen	1.69
hydrogen	22.73
nitrogen	6.76
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,680.89
(Based on EPA RM-19) at 68 deg F and 14.696 psia

F-Factor Calculation:

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

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

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

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

References:

[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: 1030-2011030415-002A

March 24, 2011

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

Sample ID:		Sampled By:		
Station Name :	Unit 3A W/ DB	Sample Of:	Gas	Spot
Station Number :		Sample Date:	03/17/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:		PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/23/2011 10:52:16
Nitrogen	4.098	6.760				
Carbon Dioxide	0.895	2.319				
Methane	94.066	88.862				
Ethane	0.762	1.349	0.203			
Propane	0.077	0.200	0.021			
Iso Butane	0.013	0.044	0.004			
n-Butane	0.011	0.038	0.003			
Hexanes Plus	0.078	0.428	0.034			
	100.000	100.000	0.265			

	C2 +	C3 +	iC5 +	
GPM TOTAL :	0.265	0.062	0.034	
Relative Density	Real Gas			0.5872
Calculated Molecular Weight				16.98
Compressibility Factor				0.9980

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	972
	Saturated Basis	955

Comments : Note Nitrogen. ; Insufficient Sample For Rerun.
Cylinder Number 3213

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: 1030-2011030415-002A

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

March 24, 2011

Sample ID:
Station Name: Unit 3A W/ DB
Station Number :
Location: Tulsa, OK
Sample Point:

Sampled By:
Sample Of: Gas
Sample Date: 03/17/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	NR	PPMW		EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	NR	Wt%.		EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	NR	gr/100 cu.ft.		EM	03/24/11

Comments: Cylinder Number: 3213
NR= No result (Insufficient sample)
Sample On: 03/17/2011

Hydrocarbon Laboratory Manager

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

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

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

Project Number:	bv-10-westcounty.fl-comp#1	Laboratory Analysis Requested:	
Person Taking Samples:	JRF		

Sample Number	Location	Date	Volume	Analysis Method			
				ASTM 6667	GPA 2261		
002880	Unit 3A w/o DB	3/16/2011		X	X		
003213	Unit 3A w/DB	3/17/2011		X	X		
	email to: jake@airhygiene.com						
	Sulfur reported in gr/100 dscf, wt%, and ppmw						

Relinquished by: (Signature) ____ Date: ____ Time: ____ Received by: (Signature) ____ Date: 3/21/11 Time: 930 Am

Relinquished by: (Signature) ____ Date: ____ Time: ____ Received by: (Signature) ____ Date: ____ 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	03/16/11
Project #	bv-10-westcounty.fl-comp#2
Unit Number	3A
Load	Base Load
Number of Ports Available	4
Number of Ports Used	4

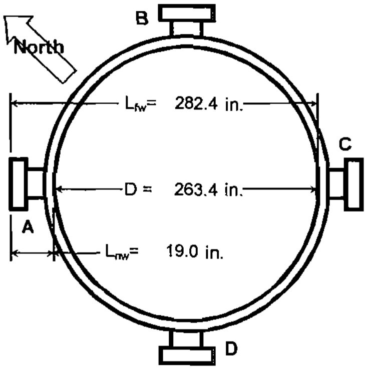
Stack and Test Type

○ Isokinetic Traverse (Wet Chemistry Testing) ○ Velocity Traverse (Flow and Flow RATA Test) ● **Stratification Traverse (Compliance Test)** ☐ RM 20 ○ Stratification Traverse (RATA) ☐ Part 60 ☐ Part 75	**Circular Stack**

METHOD 1 - STRATIFICATION TEST FOR A CIRCULAR SOURCE

Company	Florida Power and Light	**Date**	03/16/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
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_s)	378.35	ft^2

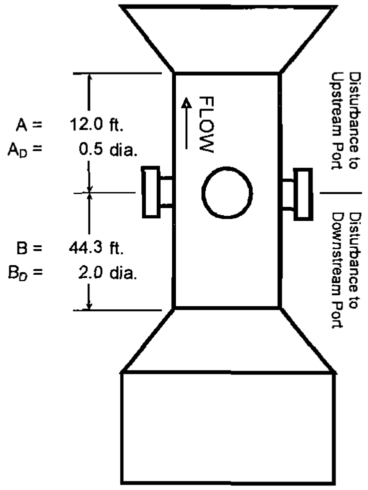


Distance from Disturbances to Port			
Distance Upstream	(A)	144.00	in.
Diameters Upstream	(A_D)	0.55	diameters
Distance Downstream	(B)	531.75	in.
Diameters Downstream	(B_D)	2.02	diameters

Number of Traverse Points Required					
Diameters to		Minimum Number of[1]		**Minimum Number of**	
Flow Disturbance		Traverse Points		**Traverse Points**	
Down (B_D)	Up (A_D)	Particulate	Velocity	**Comp Stratification**	
Stream	Stream	Points	Points	**Criteria**	**Points**
2.00-4.99	0.50-1.24	24	16	● RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	○ 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		
>= 8.00	>=2.00	8 or 12[2]	8 or 12[2]	Minimum Number of	
Upstream Spec		24	16	Traverse Points	
Downstream Spec		24	16	RATA Stratification	
Traverse Pts Required		24	16	Criteria	Points
				○ Part75/60	12 RM1 pts
				○ 75 abrv (a)	3 points
				○ 75 abrv (b)	6 points

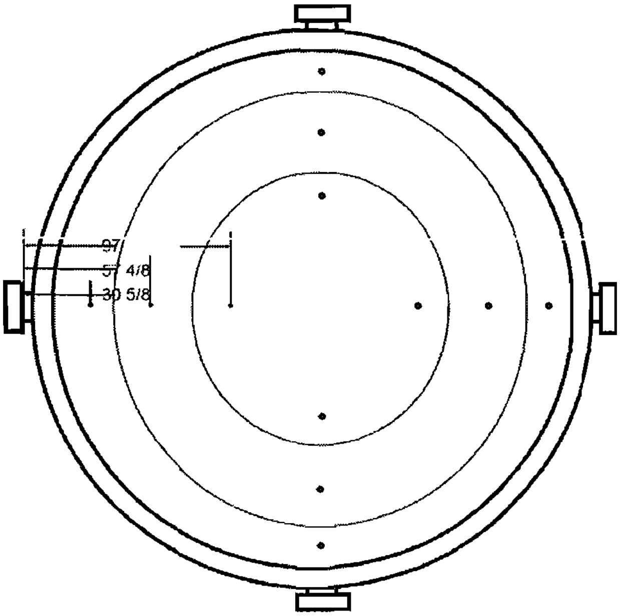
[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

[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**	03/16/11
Plant Name	West County Energy Center		**Project #**	bv-10-westcounty.fl-comp#2
Equipment	Mitsubishi 501G		**# of Ports Available**	4
Location	Loxahatchee, Florida		**# of Ports Used**	4

Stack Dimensions			
Diameter or Length of Stack	(D)	263.38	in.
Width of Stack	(W)		in.
Area of Stack	(A_s)	378.35	ft^2

Traverse Data			
4	**Ports by**	3	**Pts / port**
12	**Pts Used**	12	**Required**
Run Start	8:45:56	**Run End**	9:28:26

Traverse Point	Time Per Point	Point Start Time	Point Stop Time (Reading)	O2	Percent Difference	CO	Percent Difference	NOx	Percent Difference
	min.	hh:mm:ss	hh:mm:ss	%	%	ppm	%	ppm	%
D-3	3.00	8:45:56	8:48:56	13.31	**0.64%**	0.59	6.63%	2.16	1.71%
D-2	3.00	8:48:56	8:51:56	13.31	**0.64%**	0.46	**16.87%**	1.95	11.26%
D-1	3.00	8:51:56	8:54:56	13.41	0.11%	0.51	7.83%	1.98	9.90%
C-3	4.50	8:54:56	8:59:26	13.35	0.34%	0.53	4.22%	1.97	10.35%
C-2	3.00	8:59:26	9:02:26	13.34	0.42%	0.49	11.45%	2.55	16.04%
C-1	3.00	9:02:26	9:05:26	13.38	0.12%	0.61	10.24%	1.79	**18.54%**
B-3	7.00	9:05:26	9:12:26	13.41	0.11%	0.61	10.24%	2.45	11.49%
B-2	3.00	9:12:26	9:15:26	13.43	0.26%	0.56	1.20%	2.39	8.76%
B-1	3.00	9:15:26	9:18:26	13.45	0.40%	0.58	4.82%	2.16	1.71%
A-3	4.00	9:18:26	9:22:26	13.45	0.40%	0.57	3.01%	2.52	14.68%
A-2	3.00	9:22:26	9:25:26	13.46	0.48%	0.59	6.63%	2.23	1.48%
A-1	3.00	9:25:26	9:28:26	13.45	0.40%	0.54	2.41%	2.22	1.02%
Average				13.40		0.55		2.20	

STRAT TEST DETERMINED SAMPLE POINTS FOR CIRCULAR STACK

Company	Florida Power and Light	**Date**	03/16/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
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**	8:45:56	**Run End**	9:28:26

40 CFR 60, Appendix A, Method 7E Criteria

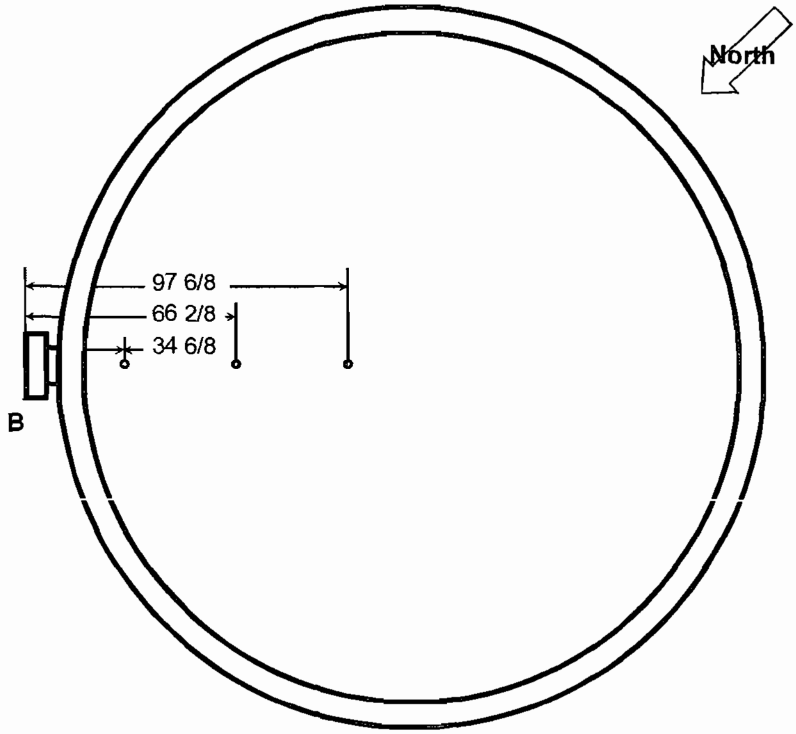
Stratification Results	
Maximum Percent Difference	18.54 % for NOx
Maximum Pollutant Conc. Diff.	0.41 ppm for NOx
Maximum Diluent Conc. Diff.	0.09 % for O2
Stack Diameter	263.38 in.

Stratification Conclusions	
Maximum % Diff.	Percent Diff. >10% Failed Stratification Test
Maximum Conc. Diff.	Conc. Diff. ≤ 0.5% Passed 3A 8.1 Three Pt. Criteria
Stack Diameter	D > 93.6 in.

Traverse Point Number	**Percent of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
	%	in.	in.
1	6.0%	15 6/8	34 6/8
2	17.9%	47 2/8	66 2/8
3	29.9%	78 6/8	97 6/8

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

Test Type
☐ Moisture, for MW
☐ Moisture, for wet-to-dry
☑ Gas
☐
☐ 6.5.6(b)(2) alt. points could apply



AIR HYGIENE, INC.

Testing Solutions for a Better World

RECEIVED
APR 27 2011
BUREAU OF
AIR REGULATION

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3B
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 19-20, 2011

Corporate Headquarters
5634 S. 122nd E. Ave. Suite F
Tulsa, OK 74146

AIR HYGIENE, INC.
(918) 307-8865 or (888) 461-8778
www.airhygiene.com

Remote Testing Offices
Las Vegas, NV 89156
Ft. Worth, TX 76028
Humble, TX 77338
Shreveport, LA 71115
Miami, FL 33101
Philadelphia, PA 19136

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3B
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 19-20, 2011

Prepared and Reviewed by:

M Sharif

Mars Sharief, QSTI, Director of Specialty Testing

Paul R Little

Paul Little, QSTI, Director of Customer Service

Jake Fahlenkamp, QSTI, Director of Quality Assurance

Table of Contents

APPENDICES

Emissions Compliance Test
Mitsubishi, Model 501G, Unit 3B
Florida Power and Light
West County Energy Center
Loxahatchee, Florida
March 19-20, 2011

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), ammonia (NH_3), opacity, carbon dioxide (CO_2), and oxygen (O_2) from the exhaust of the Mitsubishi, Model 501G, Unit 3B 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 March 19-20, 2011.

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 two test loads (Base Load and Base Load with Duct Burners). 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 NOx, CO, VOC, NH_3, opacity, CO_2, and O_2 from the exhaust of Florida Power and Light's Mitsubishi, Model 501G, Unit 3B at Base Load and Base Load with Duct Burners of total capacity.

1.2 SUMMARY OF TEST PROGRAM

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

1.2.1 Participating Organizations
  - Florida Department of Environmental Protection (FDEP)
  - Florida Power and Light
  - Black and Veatch
  - Air Hygiene

1.2.2 Industry
  - Electric Utility / Electric Services

1.2.3 Air Permit and Federal Requirements
  - Permit Number: PSD-FL-396
  - Emission Unit Identification (ID): 014

1.2.4 Plant Location
  - West County Energy Center near Loxahatchee, Florida

1.2.5 Equipment Tested
  - Mitsubishi, Model 501G, Unit 3B

1.2.6 Emission Points
  - Exhaust from the Mitsubishi, Model 501G, Unit 3B
  - For all gases, three sample points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3B, determined after conducting a stratification test (refer to Appendix F)
  - For all NH_3 testing, 24 sampling points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3B (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 3B

1.2.7 Pollutants Measured
  - NOx
  - CO
  - VOC
  - NH_3
  - Opacity
  - CO_2
  - O_2

1.2.8 Dates of Emission Test
  - March 19-20, 2011

1.3 KEY PERSONNEL

Florida Power and Light:	John Mirino	305-242-3895
Florida Power and Light:	David Fawcett	561-904-4907
Black and Veatch:	Bill Stevenson	913-458-8549
Air Hygiene:	Jake Fahlenkamp	918-307-8865
Air Hygiene:	Thomas Graham	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Florida Power and Light's Mitsubishi, Model 501G, Unit 3B located at the West County Energy Center on March 19-20, 2011 are summarized in the following table.

TABLE 2.1
SUMMARY OF MITSUBISHI, 501G, UNIT 3B RESULTS

Parameter	Base Load	Permit Limits	Base W/Db Load	Permit Limits
Date (mm/dd/yy)	03/19/11	–	03/20/11	–
Start Time (hh:mm:ss)	9:32:10	–	7:52:16	–
End Time (hh:mm:ss)	13:04:40	–	11:25:46	–
Run Duration (min / run)	60	–	60	–
Bar. Pressure (in. Hg)	30.24	–	30.25	–
Amb. Temp. (°F)	76	–	71	–
Rel. Humidity (%)	50	–	71	–
Spec. Humidity (lb water / lb air)	0.009150	–	0.011155	–
Load Designator	Base	–	Base w/DB	–
NH3 Injection Rate (lb/hr)	255.1	–	259.6	–
Turbine Fuel Flow (lb/min)	1,852	–	1,883	–
Duct Burner Fuel Flow (lb/min)	0	–	177	–
Total Fuel Flow (SCFH)	2,586,608	–	2,878,132	–
Stack Flow (RM19) (SCFH)	59,205,994	–	59,898,880	–
Stack Moisture (% Method 4)	9.4	–	9.8	–
Heat Input (MMBtu/hr)	2,301.4	2,333	2,596.9	2,761
Power Output (megawatts)	250.0	–	253.9	–
NOx (ppmvd)	2.31	–	2.55	–
NOx (ppm@15%O_2)	1.75	2.0	1.73	2.0
NOx (ppm@15%O_2&ISO)	1.76	–	1.83	–
NOx (lb/hr)	16.33	20.0	18.25	20.0
NOx (ton/year) at 8760 hr/year	71.53	–	79.92	–
NOx (lb/MMBtu)	0.006	–	0.006	–
CO (ppmvd)	0.59	–	1.24	–
CO (ppm@15%O_2)	0.45	4.1	0.84	7.6
CO (ppm@15%O_2&ISO)	0.45	–	0.89	–
CO (lb/hr)	2.53	23.2	5.41	52.5
CO (ton/year) at 8760 hr/year	11.10	–	23.68	–
CO (lb/MMBtu)	0.001	–	0.002	–
VOC (ppmvd)	0.52	–	1.19	–
VOC (ppm@15%O_2)	0.40	1.2	0.81	1.5
VOC (ppm@15%O_2&ISO)	0.40	–	0.86	–
VOC (lb/hr)	1.29	4.1	2.98	5.4
VOC (ton/year) at 8760 hr/year	5.66	–	13.04	–
VOC (lb/MMBtu)	0.001	–	0.001	–
Sulfur (gr S/100 scf) (wt% for Fuel Oil)	<0.032	2	<0.032	2
NH_3 (ppmvd)	0.96	–	0.88	–
NH_3 (ppm@15%O_2)	0.72	5	0.60	5
Opacity (%)	0	10	0	10
CO_2 (%)	4.45	–	4.93	–
O_2 (%)	13.10	–	12.20	–

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 & 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 3,750 megawatt (MW) greenfield power plant and consists of three combined cycle units (Unit 1, 2 and 3). 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 unit 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 lower heating value (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 carbon monoxide (CO), particulate matter (PM), sulfuric acid mist (H_2SO_4), sulfur dioxide (SO_2) and volatile organic compounds (VOCs). Dry Low-NOx (DLN) combustors for gas firing and water injection for oil firing reduce nitrogen oxides (NOx) emissions. A selective catalyst reduction (SCR) system further reduces NOx emissions.

3.2 SAMPLING LOCATION

The 501G stack is circular and measures 21.9 feet (ft) (263 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 44.3 ft (531 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 NH_3 testing, an initial velocity traverse was performed across the stack at base load from 24 total points. All NH_3 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 3B 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 March 19-20, 2011.

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 6667	Fuel Gas Sample and Laboratory Analysis

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 7e, 9, 10, 19, 25a, and Conditional Test Method (CTM)-027.

Figure 4.1 depicts the sample system used for the NOx, CO, THC, CO_2, and O_2 tests. A stainless steel probe was inserted into the sample ports of the stack to extract gas measurements from the emission stream at three points located at 0.4 (15.7), 1.2 (47.2), and 2.0 (78.7) meters (inches) from the wall of the stack. 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 NOx, CO, CO_2, and O_2 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. NOx 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 (NH_3). 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 3B at each of the multiple test loads for NOx, CO, THC, CO_2, NH_3, opacity, and O_2.

The stack gas analysis for O_2 and CO_2 concentrations was performed in accordance with procedures set forth in EPA Method 3a. The O_2 analyzer uses a paramagnetic cell detector and the CO_2 analyzer uses a continuous nondispersive infrared analyzer.

EPA Method 7e was used to determine concentrations of NOx. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO_2 in nitrogen certified gas cylinder was used to verify at least a 90 percent NO_2 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
NOx	THERMO 42i-HL	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	THERMO 51C-HT	User may select up to 10,000 ppm	0.1 ppm	Flame Ionization Detector.
O_2	THERMO 42i-HL	0-25%	0.1%	Paramagnetic cell, inherently linear.

E:\SHARED\DRAWINGS\EMISSIONS TESTING LAB.PPT 04/18/08 DRAWING:08-001 TKG

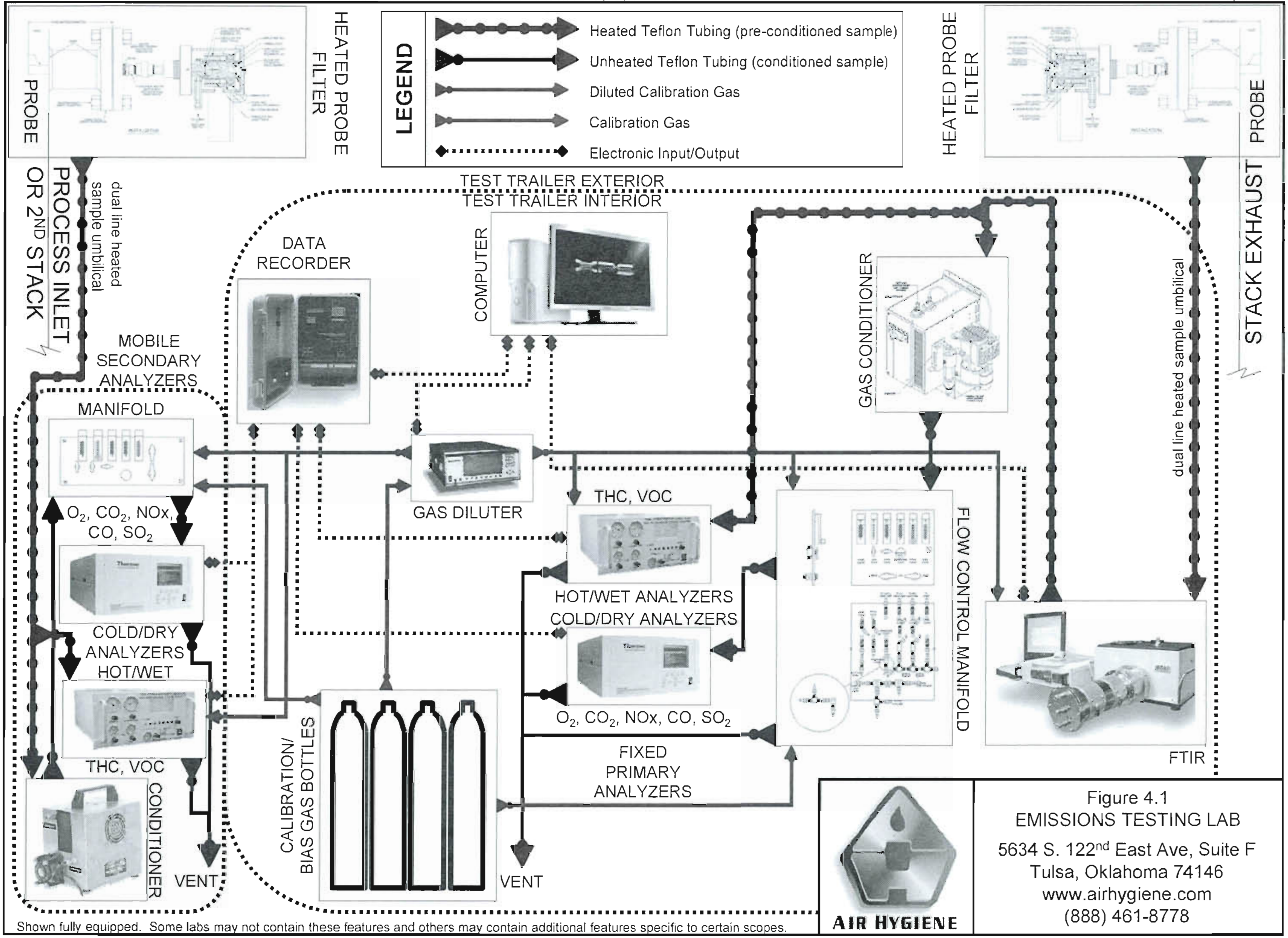


Figure 4.1
EMISSIONS TESTING LAB

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

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

E:\SHARED\DRAWINGS\SAMPLING TRAIN – GEN3.PPT 02/11/04 DRAWING:04-002 TKG

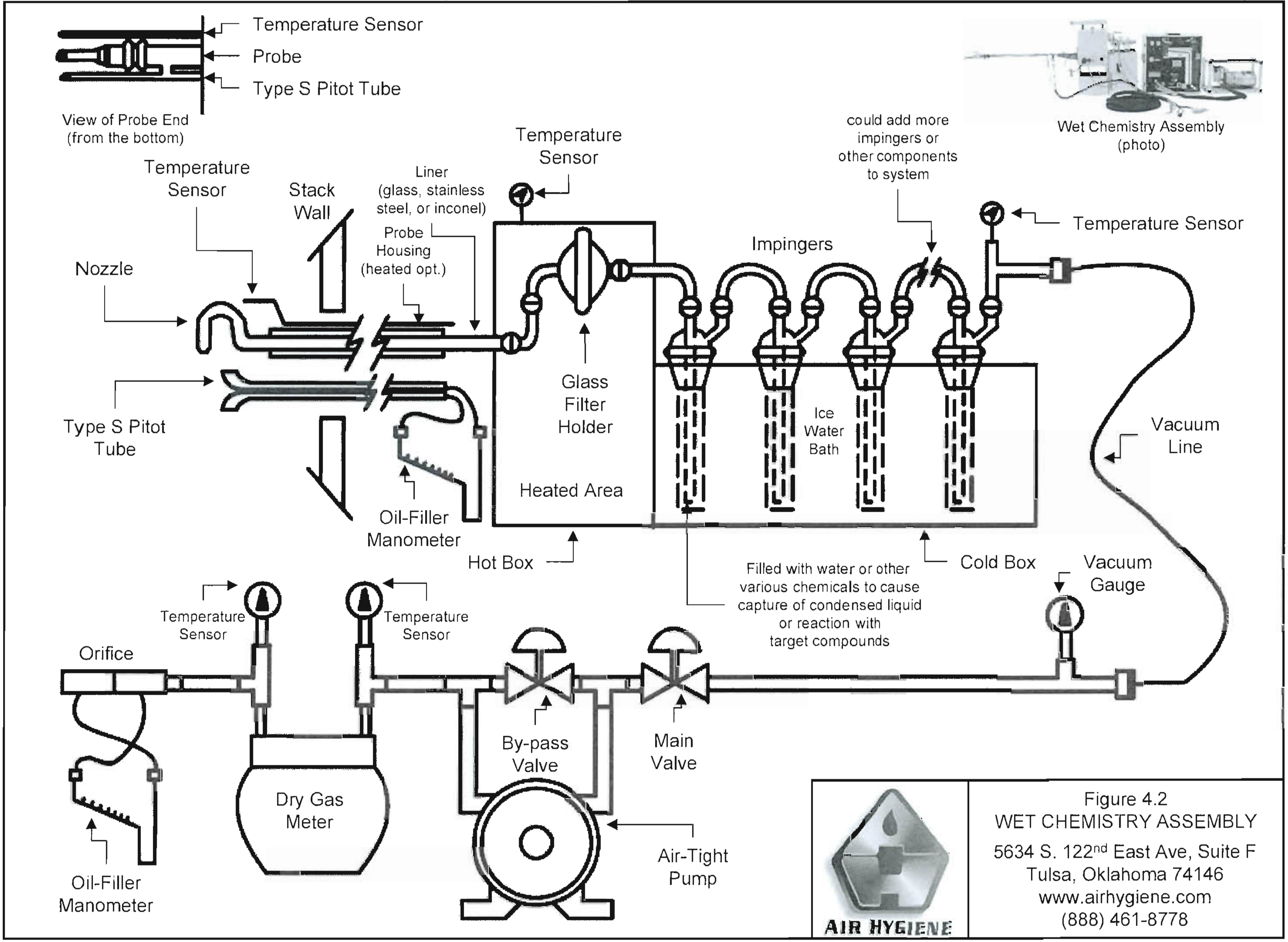


Figure 4.2
WET CHEMISTRY ASSEMBLY

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
3B	Base Load	Stratification Test	1	03/19/11	8:47:10	9:26:40	DAHS
3B	Base	Compliance	1	03/19/11	9:32:10	10:31:40	DAHS
3B	Base	Compliance	2	03/19/11	10:45:10	11:44:40	DAHS
3B	Base	Compliance	3	03/19/11	12:05:10	13:04:40	DAHS
3B	Base W/Db	Compliance	4	03/20/11	7:52:16	8:51:46	DAHS
3B	Base W/Db	Compliance	5	03/20/11	9:13:16	10:12:46	DAHS
3B	Base W/Db	Compliance	6	03/20/11	10:26:16	11:25:46	DAHS
3B	Base	Preliminaries	Base-V1	03/19/11	8:49:00	9:23:00	DAHS
3B	Base	Ammonia	Base-1	03/19/11	9:34:00	10:46:00	DAHS
3B	Base	Ammonia	Base-2	03/19/11	10:56:00	12:08:00	DAHS
3B	Base	Ammonia	Base-3	03/19/11	12:22:00	13:35:00	DAHS
3B	Base wDB	Ammonia	Base wDB-1	03/20/11	7:50:00	9:01:00	DAHS
3B	Base wDB	Ammonia	Base wDB-2	03/20/11	9:09:00	10:17:00	DAHS
3B	Base wDB	Ammonia	Base wDB-3	03/20/11	10:24:00	11:32:00	DAHS
3B	Base	Opacity	1	03/19/11	10:45:00	11:44:00	DAHS
3B	Base	Opacity	2	03/19/11	11:46:00	12:45:00	DAHS
3B	Base	Opacity	3	03/19/11	12:50:00	13:49:00	DAHS
3B	Base W/DB	Opacity	1	03/20/11	9:00:00	10:00:00	DAHS
3B	Base W/DB	Opacity	2	03/20/11	10:08:00	11:07:00	DAHS
3B	Base W/DB	Opacity	3	03/20/11	11:17:00	12:16:00	DAHS

Note: DAHS Time (EST minus 1hr)

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load

TABLE A.2
MITSUBISHI, 501G, UNIT 3B BASE LOAD DATA SUMMARY

Parameter	Base Load, Run - 1-1	Base Load, Run - 1-2	Base Load, Run - 1-3	Average
Date (mm/dd/yy)	03/19/11	03/19/11	03/19/11	03/19/11
Start Time (hh:mm:ss)	9:32:10	10:45:10	12:05:10	9:32:10
End Time (hh:mm:ss)	10:31:40	11:44:40	13:04:40	13:04:40
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.25	30.23	30.25	30.24
Amb. Temp. (°F)	75	71	81	76
Rel. Humidity (%)	52	58	39	50
Spec. Humidity (lb water / lb air)	0.009505	0.009268	0.008678	0.009150
Load Designator	Base	Base	Base	Base
NH3 Injection Rate (lb/hr)	267.3	253.9	244.2	255.1
Turbine Fuel Flow (lb/min)	1,885	1,858	1,812	1,852
Duct Burner Fuel Flow (lb/min)	0	0	0	0
Total Fuel Flow (SCFH)	2,633,655	2,595,478	2,530,692	2,586,608
Stack Flow (RM19) (SCFH)	60,185,111	59,319,271	58,113,601	59,205,994
Stack Moisture (% Method 4)	9.5	9.4	9.4	9.4
Heat Input (MMBtu/hr)	2,343.3	2,309.3	2,251.6	2,301.4
Power Output (megawatts)	254.6	250.2	245.0	250.0
NOx (ppmvd)	2.41	2.23	2.29	2.31
NOx (ppm@15%O_2)	1.82	1.69	1.74	1.75
NOx (ppm@15%O_2&ISO)	1.84	1.72	1.70	1.76
NOx (lb/hr)	17.29	15.82	15.88	16.33
NOx (ton/year) at 8760 hr/year	75.75	69.30	69.55	71.53
NOx (lb/MMBtu)	0.007	0.006	0.006	0.006
CO (ppmvd)	0.58	0.55	0.64	0.59
CO (ppm@15%O_2)	0.44	0.41	0.49	0.45
CO (ppm@15%O_2&ISO)	0.44	0.42	0.48	0.45
CO (lb/hr)	2.54	2.36	2.70	2.53
CO (ton/year) at 8760 hr/year	11.13	10.35	11.82	11.10
CO (lb/MMBtu)	0.001	0.001	0.001	0.001
VOC (ppmvd)	0.48	0.79	0.30	0.52
VOC (ppm@15%O_2)	0.37	0.60	0.23	0.40
VOC (ppm@15%O_2&ISO)	0.37	0.61	0.22	0.40
VOC (lb/hr)	1.21	1.95	0.72	1.29
VOC (ton/year) at 8760 hr/year	5.30	8.54	3.13	5.66
VOC (lb/MMBtu)	0.000	0.001	0.000	0.001
Sulfur (gr S/100 scf)	<0.032	<0.032	<0.032	<0.032
NH_3 (ppmvd)	1.02	0.91	0.94	0.96
NH_3 (ppm@15%O_2)	0.77	0.69	0.72	0.72
Opacity (%)	0	0	0	0
CO_2 (%)	4.53	4.42	4.41	4.45
O_2 (%)	13.09	13.09	13.13	13.10

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,885	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,633,655	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	52
Ambient Temperature	75
Specific Humidity	0.009505

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,343	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	60,185,111	SCFH

Data from: Run 1 NH3

Base 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 (%)**
03/19/11 09:32:10	9300	13.16	2.93	0.53	0.61	4.65
03/19/11 09:32:40	9330	13.16	3.02	0.45	0.60	4.65
03/19/11 09:33:10	9360	13.14	3.10	0.48	0.57	4.66
03/19/11 09:33:40	9390	13.18	3.28	0.50	0.59	4.66
03/19/11 09:34:10	9420	13.19	3.36	0.51	0.61	4.68
03/19/11 09:34:40	9450	13.16	3.39	0.47	0.56	4.66
03/19/11 09:35:10	9480	13.15	3.41	0.46	0.56	4.67
03/19/11 09:35:40	9510	13.15	3.49	0.44	0.55	4.67
03/19/11 09:36:10	9540	13.15	3.55	0.48	0.51	4.67
03/19/11 09:36:40	9570	13.14	3.54	0.43	0.52	4.68
03/19/11 09:37:10	9600	13.15	3.52	0.47	0.53	4.68
03/19/11 09:37:40	9630	13.15	3.40	0.51	0.50	4.68
03/19/11 09:38:10	9660	13.15	3.29	0.49	0.51	4.68
03/19/11 09:38:40	9690	13.15	3.14	0.51	0.50	4.69
03/19/11 09:39:10	9720	13.15	3.00	0.46	0.48	4.68
03/19/11 09:39:40	9750	13.16	2.91	0.49	0.50	4.69
03/19/11 09:40:10	9780	13.16	2.93	0.48	0.50	4.68
03/19/11 09:40:40	9810	13.17	2.98	0.52	0.48	4.69
03/19/11 09:41:10	9840	13.15	2.96	0.47	0.48	4.69
03/19/11 09:41:40	9870	13.15	2.88	0.56	0.49	4.71
03/19/11 09:42:10	9900	13.16	2.79	0.47	0.47	4.69
03/19/11 09:42:40	9930	13.18	2.76	0.58	0.49	4.69
03/19/11 09:43:10	9960	13.18	2.78	0.44	0.51	4.69
03/19/11 09:43:40	9990	13.17	2.75	0.48	0.47	4.69
03/19/11 09:44:10	10020	13.16	2.81	0.49	0.46	4.70
03/19/11 09:44:40	10050	13.16	2.90	0.51	0.46	4.69
03/19/11 09:45:10	10080	13.16	2.98	0.52	0.44	4.70
03/19/11 09:45:40	10110	13.15	3.01	0.48	0.44	4.69
03/19/11 09:46:10	10140	13.15	3.08	0.49	0.45	4.71
03/19/11 09:46:40	10170	13.16	3.11	0.44	0.43	4.68
03/19/11 09:47:10	10200	13.16	3.11	0.54	0.43	4.70
03/19/11 09:47:40	10230	13.17	3.11	0.47	0.44	4.68
03/19/11 09:48:10	10260	13.17	3.09	0.45	0.44	4.69
03/19/11 09:48:40	10290	13.18	3.09	0.59	0.42	4.68
03/19/11 09:49:10	10320	13.17	3.09	0.54	0.45	4.71
03/19/11 09:49:40	10350	13.16	3.14	0.53	0.44	4.71
03/19/11 09:50:10	10380	13.16	3.16	0.48	0.43	4.71

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,885	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,633,655	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	52
Ambient Temperature	75
Specific Humidity	0.009505

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,343	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	60,185,111	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/19/11 09:50:40	10410	13.16	3.26	0.54	0.44	4.71
03/19/11 09:51:10	10440	13.16	3.26	0.49	0.45	4.71
03/19/11 09:51:40	10470	13.15	3.29	0.46	0.46	4.73
03/19/11 09:52:10	10500	13.16	3.31	0.49	0.45	4.71
03/19/11 09:52:40	10530	13.16	3.26	0.48	0.44	4.72
03/19/11 09:53:10	10560	13.15	3.27	0.49	0.43	4.70
03/19/11 09:53:40	10590	13.16	3.20	0.49	0.43	4.72
03/19/11 09:54:10	10620	13.17	3.18	0.47	0.42	4.70
03/19/11 09:54:40	10650	13.18	2.97	0.53	0.41	4.71
03/19/11 09:55:10	10680	13.17	2.49	0.47	0.42	4.70
03/19/11 09:55:40	10710	13.16	2.42	0.54	0.40	4.72
03/19/11 09:56:10	10740	13.17	2.46	0.50	0.40	4.71
03/19/11 09:56:40	10770	13.17	2.43	0.53	0.42	4.71
03/19/11 09:57:10	10800	13.16	2.40	0.49	0.41	4.72
03/19/11 09:57:40	10830	13.16	2.37	0.51	0.40	4.72
03/19/11 09:58:10	10860	13.18	2.32	0.49	0.41	4.72
03/19/11 09:58:40	10890	13.19	2.25	0.58	0.42	4.71
03/19/11 09:59:10	10920	13.17	2.10	0.54	0.41	4.73
03/19/11 09:59:40	10950	13.17	2.07	0.55	0.41	4.72
03/19/11 10:00:10	10980	13.17	2.08	0.53	0.43	4.74
03/19/11 10:00:40	11010	13.16	2.10	0.48	0.42	4.73
03/19/11 10:01:10	11040	13.16	2.07	0.51	0.41	4.75
03/19/11 10:01:40	11070	13.17	2.06	0.56	0.42	4.74
03/19/11 10:02:10	11100	13.16	2.04	0.49	0.42	4.74
03/19/11 10:02:40	11130	13.16	2.06	0.52	0.41	4.75
03/19/11 10:03:10	11160	13.16	2.07	0.50	0.43	4.75
03/19/11 10:03:40	11190	13.17	2.10	0.57	0.43	4.75
03/19/11 10:04:10	11220	13.16	2.11	0.59	0.42	4.74
03/19/11 10:04:40	11250	13.15	2.14	0.59	0.48	4.76
03/19/11 10:05:10	11280	13.12	2.07	0.95	0.45	4.77
03/19/11 10:05:40	11310	13.14	2.09	0.60	0.42	4.78
03/19/11 10:06:10	11340	13.13	2.02	0.55	0.42	4.77
03/19/11 10:06:40	11370	13.23	1.94	0.63	0.43	4.74
03/19/11 10:07:10	11400	13.22	1.80	0.81	0.42	4.72
03/19/11 10:07:40	11430	13.17	1.76	0.61	0.42	4.77
03/19/11 10:08:10	11460	13.15	1.81	0.56	0.44	4.77
03/19/11 10:08:40	11490	13.16	1.88	0.56	0.42	4.78

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,885	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,633,655	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	52
Ambient Temperature	75
Specific Humidity	0.009505

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,343	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	60,185,111	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/19/11 10:09:10	11520	13.14	1.98	0.51	0.42	4.79
03/19/11 10:09:40	11550	13.14	2.07	0.59	0.44	4.80
03/19/11 10:10:10	11580	13.14	2.12	0.89	0.42	4.80
03/19/11 10:10:40	11610	13.16	2.10	0.70	0.43	4.78
03/19/11 10:11:10	11640	13.18	1.99	0.64	0.44	4.78
03/19/11 10:11:40	11670	13.18	1.91	0.59	0.42	4.77
03/19/11 10:12:10	11700	13.24	1.95	0.62	0.44	4.75
03/19/11 10:12:40	11730	13.21	1.90	0.64	0.44	4.74
03/19/11 10:13:10	11760	13.19	1.96	0.62	0.53	4.76
03/19/11 10:13:40	11790	13.19	1.95	0.53	0.51	4.76
03/19/11 10:14:10	11820	13.18	1.97	0.58	0.49	4.76
03/19/11 10:14:40	11850	13.15	2.06	0.46	0.47	4.78
03/19/11 10:15:10	11880	13.16	2.16	0.69	0.50	4.77
03/19/11 10:15:40	11910	13.16	2.20	0.64	0.49	4.78
03/19/11 10:16:10	11940	13.18	2.14	0.54	0.45	4.75
03/19/11 10:16:40	11970	13.19	2.07	0.58	0.47	4.76
03/19/11 10:17:10	12000	13.17	1.97	0.62	0.49	4.76
03/19/11 10:17:40	12030	13.21	1.96	0.76	0.46	4.75
03/19/11 10:18:10	12060	13.23	1.91	0.70	0.47	4.73
03/19/11 10:18:40	12090	13.19	1.87	0.67	0.49	4.75
03/19/11 10:19:10	12120	13.18	1.96	0.65	0.46	4.76
03/19/11 10:19:40	12150	13.13	2.03	1.05	0.66	4.78
03/19/11 10:20:10	12180	13.16	2.05	2.46	0.52	4.78
03/19/11 10:20:40	12210	13.22	2.04	0.97	0.47	4.75
03/19/11 10:21:10	12240	13.21	2.01	0.67	0.45	4.76
03/19/11 10:21:40	12270	13.19	1.97	0.65	0.46	4.77
03/19/11 10:22:10	12300	13.24	2.01	0.52	0.44	4.74
03/19/11 10:22:40	12330	13.23	1.93	0.62	0.44	4.74
03/19/11 10:23:10	12360	13.20	1.93	0.60	0.45	4.75
03/19/11 10:23:40	12390	13.17	2.00	0.55	0.43	4.78
03/19/11 10:24:10	12420	13.16	2.06	0.49	0.43	4.78
03/19/11 10:24:40	12450	13.16	2.10	0.64	0.49	4.80
03/19/11 10:25:10	12480	13.18	2.08	1.25	0.45	4.78
03/19/11 10:25:40	12510	13.12	2.03	0.67	0.44	4.82
03/19/11 10:26:10	12540	13.22	2.03	0.45	0.45	4.77
03/19/11 10:26:40	12570	13.22	1.87	1.00	0.46	4.77
03/19/11 10:27:10	12600	13.18	1.66	1.34	0.44	4.80

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,885	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,633,655	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	52
Ambient Temperature	75
Specific Humidity	0.009505

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,343	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	60,185,111	SCFH

Data from: Run 1 NH3

Base 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 (%)**
03/19/11 10:27:40	12630	13.19	1.62	0.87	0.43	4.79
03/19/11 10:28:10	12660	13.21	1.64	0.66	0.41	4.79
03/19/11 10:28:40	12690	13.22	1.69	0.60	0.42	4.77
03/19/11 10:29:10	12720	13.20	1.74	0.59	0.43	4.79
03/19/11 10:29:40	12750	13.17	1.82	0.68	0.40	4.80
03/19/11 10:30:10	12780	13.16	1.91	0.56	0.41	4.81
03/19/11 10:30:40	12810	13.19	1.98	0.57	0.44	4.80
03/19/11 10:31:10	12840	13.22	1.96	0.55	0.42	4.78
03/19/11 10:31:40	12870	13.22	1.91	0.59	0.41	4.77
RAW AVERAGE		**13.17**	**2.45**	**0.59**	**0.46**	**4.73**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
Bias	**Initial Zero**	0.01	0.09	0.02	-0.03	0.13
	Final Zero	0.04	0.07	-0.03	0.10	0.49
	Avg. Zero	0.03	0.08	-0.01	0.04	0.31
	Initial UpScale	12.15	4.93	5.06	3.02	8.87
	Final UpScale	12.20	4.93	5.07	3.10	9.16
	Avg. UpScale	12.18	4.93	5.07	3.06	9.02
Upscale Cal Gas		12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.09	2.41	0.58	0.48	4.53
Concentration (ppm@ 15%O_2)	N/A	1.82	0.44	0.37	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.84	0.44	0.37	N/A
Emission Rate (lb/hr)	N/A	17.29	2.54	1.21	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	75.75	11.13	5.30	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.000	N/A

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,858	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,595,478	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	58
Ambient Temperature	71
Specific Humidity	0.009268

Unit Data

Unit Load	250.2	megawatts
Heat Input	2,309	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	254	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,319,271	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/19/11 10:45:10	13680	13.22	2.10	0.49	0.39	4.80
03/19/11 10:45:40	13710	13.24	2.08	0.57	0.40	4.80
03/19/11 10:46:10	13740	13.17	2.03	0.58	0.39	4.83
03/19/11 10:46:40	13770	13.18	2.11	0.55	0.37	4.85
03/19/11 10:47:10	13800	13.24	2.12	0.59	0.39	4.81
03/19/11 10:47:40	13830	13.27	1.99	0.72	0.40	4.79
03/19/11 10:48:10	13860	13.21	1.90	0.72	0.38	4.82
03/19/11 10:48:40	13890	13.20	1.92	0.54	0.39	4.84
03/19/11 10:49:10	13920	13.20	2.01	0.53	0.40	4.86
03/19/11 10:49:40	13950	13.25	2.02	0.46	0.38	4.82
03/19/11 10:50:10	13980	13.29	1.95	0.62	0.39	4.81
03/19/11 10:50:40	14010	13.27	1.85	0.56	0.40	4.80
03/19/11 10:51:10	14040	13.21	1.86	0.63	0.39	4.83
03/19/11 10:51:40	14070	13.21	1.93	0.59	0.39	4.85
03/19/11 10:52:10	14100	13.21	2.00	0.52	0.40	4.83
03/19/11 10:52:40	14130	13.22	1.97	0.57	0.38	4.84
03/19/11 10:53:10	14160	13.23	1.99	0.47	0.38	4.83
03/19/11 10:53:40	14190	13.22	1.99	0.52	0.40	4.84
03/19/11 10:54:10	14220	13.17	1.98	0.43	0.38	4.86
03/19/11 10:54:40	14250	13.22	2.02	0.53	0.38	4.85
03/19/11 10:55:10	14280	13.30	1.98	0.63	0.40	4.80
03/19/11 10:55:40	14310	13.26	1.91	0.57	0.40	4.81
03/19/11 10:56:10	14340	13.21	1.96	0.47	0.38	4.84
03/19/11 10:56:40	14370	13.20	2.03	0.57	0.38	4.85
03/19/11 10:57:10	14400	13.25	2.08	0.45	0.38	4.84
03/19/11 10:57:40	14430	13.28	2.08	0.52	0.38	4.81
03/19/11 10:58:10	14460	13.28	2.03	0.57	0.41	4.82
03/19/11 10:58:40	14490	13.26	2.03	0.53	0.40	4.83
03/19/11 10:59:10	14520	13.25	2.07	0.54	0.37	4.84
03/19/11 10:59:40	14550	13.25	2.11	0.51	0.39	4.84
03/19/11 11:00:10	14580	13.24	2.12	0.43	0.40	4.84
03/19/11 11:00:40	14610	13.24	2.12	0.49	0.38	4.85
03/19/11 11:01:10	14640	13.27	2.11	0.47	0.38	4.83
03/19/11 11:01:40	14670	13.28	1.99	0.51	0.40	4.82
03/19/11 11:02:10	14700	13.26	1.90	0.60	0.38	4.82
03/19/11 11:02:40	14730	13.22	1.89	0.48	0.39	4.87
03/19/11 11:03:10	14760	13.22	1.95	0.50	0.39	4.85

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,858	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,595,478	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	58
Ambient Temperature	71
Specific Humidity	0.009268

Unit Data

Unit Load	250.2	megawatts
Heat Input	2,309	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	254	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,319,271	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/19/11 11:03:40	14790	13.25	1.91	0.53	0.39	4.86
03/19/11 11:04:10	14820	13.29	1.85	0.52	0.39	4.81
03/19/11 11:04:40	14850	13.24	1.75	0.52	0.41	4.84
03/19/11 11:05:10	14880	13.21	1.76	0.46	0.40	4.86
03/19/11 11:05:40	14910	13.26	1.82	0.48	0.41	4.84
03/19/11 11:06:10	14940	13.28	1.79	0.55	0.57	4.85
03/19/11 11:06:40	14970	13.28	1.93	0.52	0.60	4.83
03/19/11 11:07:10	15000	13.27	2.01	0.53	0.62	4.85
03/19/11 11:07:40	15030	13.25	2.06	0.51	0.63	4.85
03/19/11 11:08:10	15060	13.24	2.18	0.43	0.70	4.86
03/19/11 11:08:40	15090	13.24	2.26	0.35	0.74	4.87
03/19/11 11:09:10	15120	13.25	2.30	0.52	0.72	4.86
03/19/11 11:09:40	15150	13.26	2.26	0.48	1.10	4.86
03/19/11 11:10:10	15180	13.22	2.22	0.45	0.85	4.87
03/19/11 11:10:40	15210	13.25	2.25	0.46	1.10	4.87
03/19/11 11:11:10	15240	13.25	2.25	0.55	0.97	4.85
03/19/11 11:11:40	15270	13.20	2.20	0.51	1.02	4.89
03/19/11 11:12:10	15300	13.18	2.26	0.42	1.88	4.91
03/19/11 11:12:40	15330	13.28	2.24	0.50	2.01	4.87
03/19/11 11:13:10	15360	13.34	2.08	0.62	1.63	4.84
03/19/11 11:13:40	15390	13.24	1.94	0.65	0.98	4.87
03/19/11 11:14:10	15420	13.25	1.97	0.46	1.79	4.89
03/19/11 11:14:40	15450	13.29	2.07	0.52	1.38	4.86
03/19/11 11:15:10	15480	13.23	2.11	0.48	0.84	4.90
03/19/11 11:15:40	15510	13.25	2.19	0.56	0.71	4.88
03/19/11 11:16:10	15540	13.26	2.25	0.49	1.99	4.88
03/19/11 11:16:40	15570	13.27	2.31	0.56	1.24	4.88
03/19/11 11:17:10	15600	13.22	2.34	0.53	0.71	4.90
03/19/11 11:17:40	15630	13.21	2.43	0.43	1.14	4.93
03/19/11 11:18:10	15660	13.28	2.50	0.41	1.11	4.88
03/19/11 11:18:40	15690	13.30	2.35	0.49	0.57	4.88
03/19/11 11:19:10	15720	13.26	2.21	0.51	0.92	4.89
03/19/11 11:19:40	15750	13.24	2.19	0.51	0.62	4.92
03/19/11 11:20:10	15780	13.27	2.27	0.50	0.39	4.90
03/19/11 11:20:40	15810	13.24	2.28	0.49	0.27	4.90
03/19/11 11:21:10	15840	13.30	2.33	0.58	1.71	4.88
03/19/11 11:21:40	15870	13.29	2.25	0.52	0.99	4.86

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,858	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,595,478	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	58
Ambient Temperature	71
Specific Humidity	0.009268

Unit Data

Unit Load	250.2	megawatts
Heat Input	2,309	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	254	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,319,271	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/19/11 11:22:10	15900	13.25	2.23	0.59	0.99	4.89
03/19/11 11:22:40	15930	13.17	2.32	0.54	0.50	4.92
03/19/11 11:23:10	15960	13.23	2.37	0.46	1.34	4.92
03/19/11 11:23:40	15990	13.29	2.41	0.47	1.20	4.88
03/19/11 11:24:10	16020	13.30	2.33	0.48	0.80	4.87
03/19/11 11:24:40	16050	13.28	2.26	0.50	1.06	4.89
03/19/11 11:25:10	16080	13.27	2.25	0.49	0.52	4.88
03/19/11 11:25:40	16110	13.27	2.29	0.43	0.26	4.89
03/19/11 11:26:10	16140	13.26	2.26	0.45	0.19	4.88
03/19/11 11:26:40	16170	13.18	2.24	0.43	0.28	4.92
03/19/11 11:27:10	16200	13.15	2.32	0.45	0.48	4.95
03/19/11 11:27:40	16230	13.26	2.31	0.37	0.48	4.91
03/19/11 11:28:10	16260	13.34	2.13	0.63	0.24	4.85
03/19/11 11:28:40	16290	13.32	1.91	0.72	1.12	4.85
03/19/11 11:29:10	16320	13.28	1.87	0.56	0.24	4.88
03/19/11 11:29:40	16350	13.20	1.93	0.54	0.19	4.91
03/19/11 11:30:10	16380	13.20	2.06	0.52	0.85	4.96
03/19/11 11:30:40	16410	13.21	2.72	0.50	1.04	4.92
03/19/11 11:31:10	16440	13.17	2.84	0.48	0.90	4.94
03/19/11 11:31:40	16470	13.21	2.80	0.41	1.15	4.94
03/19/11 11:32:10	16500	13.29	2.71	0.60	0.89	4.89
03/19/11 11:32:40	16530	13.41	2.57	0.84	0.82	4.83
03/19/11 11:33:10	16560	13.33	2.39	1.06	0.53	4.85
03/19/11 11:33:40	16590	13.28	2.53	0.73	1.10	4.90
03/19/11 11:34:10	16620	13.23	2.74	0.49	0.83	4.92
03/19/11 11:34:40	16650	13.25	2.80	0.57	1.08	4.91
03/19/11 11:35:10	16680	13.29	2.84	0.55	0.77	4.90
03/19/11 11:35:40	16710	13.30	2.83	0.63	0.52	4.89
03/19/11 11:36:10	16740	13.28	2.89	0.54	1.05	4.92
03/19/11 11:36:40	16770	13.25	2.93	0.47	0.70	4.92
03/19/11 11:37:10	16800	13.21	2.94	0.48	0.64	4.95
03/19/11 11:37:40	16830	13.26	2.96	0.44	1.17	4.93
03/19/11 11:38:10	16860	13.32	3.01	0.53	0.97	4.89
03/19/11 11:38:40	16890	13.27	2.87	0.47	0.74	4.91
03/19/11 11:39:10	16920	13.26	2.87	0.47	0.76	4.92
03/19/11 11:39:40	16950	13.23	3.00	0.44	0.82	4.94
03/19/11 11:40:10	16980	13.17	3.16	0.42	0.74	4.97

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,858	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,595,478	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	58
Ambient Temperature	71
Specific Humidity	0.009268

Unit Data

Unit Load	250.2	megawatts
Heat Input	2,309	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	254	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	59,319,271	SCFH

Data from: Run 2 NH3

Base 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 (%)**
03/19/11 11:40:40	17010	13.23	3.25	0.41	0.79	4.97
03/19/11 11:41:10	17040	13.24	3.02	0.50	0.85	4.95
03/19/11 11:41:40	17070	13.24	2.76	0.51	0.78	4.94
03/19/11 11:42:10	17100	13.24	2.62	0.52	0.80	4.96
03/19/11 11:42:40	17130	13.26	2.56	0.49	0.76	4.93
03/19/11 11:43:10	17160	13.23	2.50	0.54	0.71	4.96
03/19/11 11:43:40	17190	13.28	2.55	0.54	0.77	4.93
03/19/11 11:44:10	17220	13.23	2.50	0.60	0.74	4.96
03/19/11 11:44:40	17250	13.19	2.59	0.52	0.67	4.98
RAW AVERAGE		**13.25**	**2.26**	**0.53**	**0.70**	**4.87**

Bias

	O_2	**NOx**	**CO**	**VOC**	**CO_2**
Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
	(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
Initial Zero	0.04	0.07	0.07	0.10	0.49
Final Zero	0.13	0.07	-0.15	-0.15	0.67
Avg. Zero	0.09	0.07	-0.04	-0.03	0.58
Initial UpScale	12.20	4.93	4.99	3.10	9.16
Final UpScale	12.30	4.90	5.08	3.08	9.30
Avg. UpScale	12.25	4.92	5.04	3.09	9.23
Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.09	2.23	0.55	0.79	4.42
Concentration (ppm@ 15%O_2)	N/A	1.69	0.41	0.60	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.72	0.42	0.61	N/A
Emission Rate (lb/hr)	N/A	15.82	2.36	1.95	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	69.30	10.35	8.54	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.001	N/A

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,812	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,530,692	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	39
Ambient Temperature	81
Specific Humidity	0.008678

Unit Data

Unit Load	245.0	megawatts
Heat Input	2,252	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	244	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	58,113,601	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/19/11 12:05:10	18480	13.29	2.63	0.51	0.20	4.93
03/19/11 12:05:40	18510	13.27	2.68	0.48	0.22	4.96
03/19/11 12:06:10	18540	13.26	2.79	0.40	0.19	4.96
03/19/11 12:06:40	18570	13.28	2.84	0.40	0.17	4.98
03/19/11 12:07:10	18600	13.31	2.93	0.42	0.18	4.95
03/19/11 12:07:40	18630	13.40	2.83	0.53	0.15	4.92
03/19/11 12:08:10	18660	13.40	2.67	0.62	0.13	4.90
03/19/11 12:08:40	18690	13.35	2.67	0.52	0.16	4.94
03/19/11 12:09:10	18720	13.29	2.79	0.49	0.16	4.97
03/19/11 12:09:40	18750	13.27	2.89	0.40	0.09	4.99
03/19/11 12:10:10	18780	13.33	3.01	0.45	0.12	4.97
03/19/11 12:10:40	18810	13.43	2.89	0.57	0.13	4.92
03/19/11 12:11:10	18840	13.40	2.69	0.65	0.08	4.93
03/19/11 12:11:40	18870	13.39	2.68	0.58	0.11	4.92
03/19/11 12:12:10	18900	13.38	2.67	0.48	0.08	4.93
03/19/11 12:12:40	18930	13.34	2.72	0.45	0.07	4.96
03/19/11 12:13:10	18960	13.34	2.85	0.42	0.09	4.95
03/19/11 12:13:40	18990	13.31	2.95	0.46	0.07	4.98
03/19/11 12:14:10	19020	13.27	2.99	0.40	0.04	5.00
03/19/11 12:14:40	19050	13.36	2.99	0.34	0.08	4.98
03/19/11 12:15:10	19080	13.43	2.69	0.53	0.07	4.93
03/19/11 12:15:40	19110	13.45	2.43	0.61	0.05	4.91
03/19/11 12:16:10	19140	13.42	2.38	0.64	0.07	4.94
03/19/11 12:16:40	19170	13.39	2.49	0.50	0.05	4.94
03/19/11 12:17:10	19200	13.31	2.64	0.50	0.03	4.99
03/19/11 12:17:40	19230	13.26	2.85	0.31	0.05	5.03
03/19/11 12:18:10	19260	13.24	2.92	0.37	0.04	5.04
03/19/11 12:18:40	19290	13.40	2.82	0.44	0.03	4.97
03/19/11 12:19:10	19320	13.49	2.50	0.75	0.08	4.90
03/19/11 12:19:40	19350	13.48	2.31	0.86	0.06	4.91
03/19/11 12:20:10	19380	13.50	2.38	0.79	0.02	4.89
03/19/11 12:20:40	19410	13.51	2.48	0.71	0.04	4.91
03/19/11 12:21:10	19440	13.48	2.68	0.60	0.05	4.91
03/19/11 12:21:40	19470	13.46	2.88	0.56	0.02	4.92
03/19/11 12:22:10	19500	13.38	3.02	0.55	0.03	4.97
03/19/11 12:22:40	19530	13.32	3.09	0.48	0.01	4.99
03/19/11 12:23:10	19560	13.32	2.93	0.39	0.01	5.00

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,812	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,530,692	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	39
Ambient Temperature	81
Specific Humidity	0.008678

Unit Data

Unit Load	245.0	megawatts
Heat Input	2,252	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	244	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	58,113,601	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/19/11 12:23:40	19590	13.38	2.89	0.45	0.04	4.97
03/19/11 12:24:10	19620	13.42	2.83	0.46	0.03	4.95
03/19/11 12:24:40	19650	13.37	2.84	0.54	0.00	4.97
03/19/11 12:25:10	19680	13.27	3.00	0.45	0.00	5.01
03/19/11 12:25:40	19710	13.23	3.20	0.28	-0.02	5.06
03/19/11 12:26:10	19740	13.23	3.13	0.29	-0.03	5.05
03/19/11 12:26:40	19770	13.33	3.03	0.40	-0.01	5.02
03/19/11 12:27:10	19800	13.45	2.44	0.60	-0.03	4.95
03/19/11 12:27:40	19830	13.56	1.91	1.07	0.00	4.88
03/19/11 12:28:10	19860	13.55	1.88	1.21	-0.01	4.89
03/19/11 12:28:40	19890	13.49	2.02	0.89	-0.04	4.90
03/19/11 12:29:10	19920	13.42	2.21	0.59	-0.05	4.96
03/19/11 12:29:40	19950	13.43	2.34	0.57	-0.03	4.95
03/19/11 12:30:10	19980	13.34	2.28	0.62	-0.05	4.99
03/19/11 12:30:40	20010	13.42	2.21	0.44	-0.03	4.98
03/19/11 12:31:10	20040	13.46	2.07	0.59	-0.03	4.93
03/19/11 12:31:40	20070	13.39	1.90	0.60	-0.06	4.97
03/19/11 12:32:10	20100	13.33	1.86	0.41	-0.04	5.01
03/19/11 12:32:40	20130	13.30	1.92	0.47	-0.04	5.02
03/19/11 12:33:10	20160	13.29	1.95	0.40	-0.06	5.04
03/19/11 12:33:40	20190	13.33	1.93	0.37	-0.05	5.02
03/19/11 12:34:10	20220	13.41	1.87	0.47	-0.03	4.98
03/19/11 12:34:40	20250	13.33	1.73	0.50	-0.07	5.02
03/19/11 12:35:10	20280	13.41	1.79	0.57	-0.04	4.98
03/19/11 12:35:40	20310	13.49	1.78	0.68	-0.01	4.94
03/19/11 12:36:10	20340	13.45	1.75	0.79	-0.04	4.93
03/19/11 12:36:40	20370	13.41	1.88	0.59	-0.03	4.98
03/19/11 12:37:10	20400	13.35	2.00	0.42	-0.06	5.01
03/19/11 12:37:40	20430	13.35	2.10	0.44	-0.07	5.01
03/19/11 12:38:10	20460	13.34	2.18	0.37	-0.04	5.03
03/19/11 12:38:40	20490	13.30	2.22	0.40	-0.04	5.04
03/19/11 12:39:10	20520	13.30	2.30	0.42	-0.10	5.05
03/19/11 12:39:40	20550	13.36	2.31	0.34	-0.08	5.01
03/19/11 12:40:10	20580	13.37	2.17	0.48	-0.03	5.00
03/19/11 12:40:40	20610	13.35	2.08	0.49	-0.08	5.01
03/19/11 12:41:10	20640	13.35	2.06	0.43	-0.11	5.00
03/19/11 12:41:40	20670	13.31	2.05	0.47	-0.09	5.03

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,812	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,530,692	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	39
Ambient Temperature	81
Specific Humidity	0.008678

Unit Data

Unit Load	245.0	megawatts
Heat Input	2,252	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	244	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	58,113,601	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/19/11 12:42:10	20700	13.32	2.09	0.37	-0.10	5.03
03/19/11 12:42:40	20730	13.46	2.12	0.45	-0.13	4.98
03/19/11 12:43:10	20760	13.42	2.03	0.63	-0.10	4.99
03/19/11 12:43:40	20790	13.41	2.09	0.69	-0.06	4.98
03/19/11 12:44:10	20820	13.44	2.14	0.57	-0.11	4.98
03/19/11 12:44:40	20850	13.42	2.18	0.63	-0.11	4.98
03/19/11 12:45:10	20880	13.40	2.25	0.57	-0.08	5.00
03/19/11 12:45:40	20910	13.37	2.36	0.52	-0.12	5.02
03/19/11 12:46:10	20940	13.35	2.40	0.47	0.27	5.03
03/19/11 12:46:40	20970	13.34	2.35	0.36	0.31	5.05
03/19/11 12:47:10	21000	13.32	2.30	0.39	0.27	5.05
03/19/11 12:47:40	21030	13.31	2.36	0.33	0.30	5.07
03/19/11 12:48:10	21060	13.28	2.34	0.35	0.30	5.08
03/19/11 12:48:40	21090	13.32	2.26	0.37	0.26	5.07
03/19/11 12:49:10	21120	13.35	2.13	0.42	0.29	5.06
03/19/11 12:49:40	21150	13.35	1.91	0.41	0.26	5.05
03/19/11 12:50:10	21180	13.35	1.75	0.49	0.18	5.06
03/19/11 12:50:40	21210	13.50	1.69	0.52	0.20	5.01
03/19/11 12:51:10	21240	13.58	1.62	1.01	0.21	4.93
03/19/11 12:51:40	21270	13.55	1.70	0.91	0.13	4.97
03/19/11 12:52:10	21300	13.45	1.89	0.64	0.14	5.00
03/19/11 12:52:40	21330	13.48	2.06	0.54	0.13	5.01
03/19/11 12:53:10	21360	13.44	2.12	0.54	0.09	5.03
03/19/11 12:53:40	21390	13.39	2.11	0.47	0.11	5.06
03/19/11 12:54:10	21420	13.39	2.08	0.41	0.08	5.08
03/19/11 12:54:40	21450	13.41	1.95	0.47	0.05	5.06
03/19/11 12:55:10	21480	13.35	1.87	0.41	0.05	5.09
03/19/11 12:55:40	21510	13.37	1.89	0.39	0.01	5.09
03/19/11 12:56:10	21540	13.39	1.92	0.40	0.02	5.07
03/19/11 12:56:40	21570	13.34	1.93	0.35	0.10	5.10
03/19/11 12:57:10	21600	13.36	1.97	0.37	0.09	5.08
03/19/11 12:57:40	21630	13.45	1.96	0.48	0.06	5.04
03/19/11 12:58:10	21660	13.41	1.83	0.54	0.06	5.04
03/19/11 12:58:40	21690	13.33	1.79	0.43	0.04	5.09
03/19/11 12:59:10	21720	13.46	1.82	0.49	-0.01	5.03
03/19/11 12:59:40	21750	13.38	1.69	0.57	-0.01	5.05
03/19/11 13:00:10	21780	13.33	1.72	0.44	0.00	5.09

Florida Power and Light
March 19, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,643	SCF exh/MMBtu
Fuel Heating Value (HHV)	988	Btu/SCF fuel
Turbine Fuel Flow	1,812	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,530,692	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	39
Ambient Temperature	81
Specific Humidity	0.008678

Unit Data

Unit Load	245.0	megawatts
Heat Input	2,252	MMBtu/hr
Combustor Inlet Pressure	270	psig
NH_3 Injection Rate	244	lb/hr
Meas. Stack Moisture	9.4	%
Stack Exhaust Flow (M19)	58,113,601	SCFH

Data from: Run 3 NH3

Base 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 (%)**
03/19/11 13:00:40	21810	13.38	1.78	0.37	-0.05	5.08
03/19/11 13:01:10	21840	13.37	1.82	0.49	-0.06	5.07
03/19/11 13:01:40	21870	13.37	1.83	0.44	-0.04	5.09
03/19/11 13:02:10	21900	13.47	1.90	0.40	-0.05	5.03
03/19/11 13:02:40	21930	13.46	1.84	0.56	-0.07	5.04
03/19/11 13:03:10	21960	13.43	1.89	0.50	-0.04	5.04
03/19/11 13:03:40	21990	13.37	2.00	0.47	-0.07	5.08
03/19/11 13:04:10	22020	13.37	2.08	0.34	-0.09	5.09
03/19/11 13:04:40	22050	13.33	2.07	0.32	-0.08	5.10
RAW AVERAGE		**13.38**	**2.30**	**0.51**	**0.04**	**5.00**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
Bias	**Initial Zero**	0.13	0.07	-0.15	-0.15	0.67
	Final Zero	0.25	0.06	-0.16	-0.42	0.80
	Avg. Zero	0.19	0.07	-0.16	-0.29	0.74
	Initial UpScale	12.30	4.90	4.96	2.98	9.30
	Final UpScale	12.39	4.85	4.96	3.26	9.39
	Avg. UpScale	12.35	4.88	4.96	3.12	9.35
Upscale Cal Gas		12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.13	2.29	0.64	0.30	4.41
Concentration (ppm@ 15%O_2)	N/A	1.74	0.49	0.23	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.70	0.48	0.22	N/A
Emission Rate (lb/hr)	N/A	15.88	2.70	0.72	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	69.55	11.82	3.13	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.000	N/A

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load with Duct Burners

TABLE A.3
MITSUBISHI, 501G, UNIT 3B BASE W/DB LOAD DATA SUMMARY

Parameter	Base W/Db Load, Run - 2-1	Base W/Db Load, Run - 2-2	Base W/Db Load, Run - 2-3	Average
Date (mm/dd/yy)	03/20/11	03/20/11	03/20/11	03/20/11
Start Time (hh:mm:ss)	7:52:16	9:13:16	10:26:16	7:52:16
End Time (hh:mm:ss)	8:51:46	10:12:46	11:25:46	11:25:46
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.23	30.25	30.27	30.25
Amb. Temp. (°F)	61	71	80	71
Rel. Humidity (%)	83	76	55	71
Spec. Humidity (lb water / lb air)	0.009375	0.012193	0.011897	0.011155
Load Designator	Base w/DB	Base w/DB	Base w/DB	Base w/DB
NH3 Injection Rate (lb/hr)	266.8	263.5	248.4	259.6
Turbine Fuel Flow (lb/min)	1,904	1,889	1,855	1,883
Duct Burner Fuel Flow (lb/min)	177	178	177	177
Total Fuel Flow (SCFH)	2,907,620	2,887,529	2,839,248	2,878,132
Stack Flow (RM19) (SCFH)	60,557,030	59,966,805	59,172,805	59,898,880
Stack Moisture (% Method 4)	10.5	10.0	9.0	9.8
Heat Input (MMBtu/hr)	2,623.5	2,605.3	2,561.8	2,596.9
Power Output (megawatts)	257.8	254.6	249.1	253.9
NOx (ppmvd)	2.57	2.49	2.59	2.55
NOx (ppm@15%O_2)	1.75	1.68	1.76	1.73
NOx (ppm@15%O_2&ISO)	1.84	1.82	1.84	1.83
NOx (lb/hr)	18.61	17.82	18.30	18.25
NOx (ton/year) at 8760 hr/year	81.53	78.06	80.16	79.92
NOx (lb/MMBtu)	0.006	0.006	0.006	0.006
CO (ppmvd)	1.16	1.20	1.36	1.24
CO (ppm@15%O_2)	0.79	0.82	0.93	0.84
CO (ppm@15%O_2&ISO)	0.83	0.88	0.97	0.89
CO (lb/hr)	5.10	5.25	5.86	5.41
CO (ton/year) at 8760 hr/year	22.35	23.00	25.68	23.68
CO (lb/MMBtu)	0.002	0.002	0.002	0.002
VOC (ppmvd)	1.41	1.32	0.85	1.19
VOC (ppm@15%O_2)	0.96	0.89	0.58	0.81
VOC (ppm@15%O_2&ISO)	1.01	0.96	0.60	0.86
VOC (lb/hr)	3.56	3.28	2.09	2.98
VOC (ton/year) at 8760 hr/year	15.58	14.38	9.14	13.04
VOC (lb/MMBtu)	0.001	0.001	0.001	0.001
Sulfur (gr S/100 scf)	<0.032	<0.032	<0.032	<0.032
NH_3 (ppmvd)	1.06	0.87	0.72	0.88
NH_3 (ppm@15%O_2)	0.72	0.59	0.49	0.60
Opacity (%)	0	0	0	0
CO_2 (%)	4.90	4.94	4.95	4.93
O_2 (%)	12.21	12.18	12.21	12.20

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,904	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,907,620	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	83
Ambient Temperature	61
Specific Humidity	0.009375

Unit Data

Unit Load	257.8	megawatts
Heat Input	2,623	MMBtu/hr
Combustor Inlet Pressure	278	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	10.5	%
Stack Exhaust Flow (M19)	60,557,030	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 07:52:16	4560	12.40	3.25	1.16	0.64	4.77
03/20/11 07:52:46	4590	12.42	3.23	1.02	0.66	4.79
03/20/11 07:53:16	4620	12.40	3.18	1.10	0.64	4.79
03/20/11 07:53:46	4650	12.40	3.22	1.12	0.75	4.79
03/20/11 07:54:16	4680	12.42	3.21	1.15	0.80	4.77
03/20/11 07:54:46	4710	12.40	3.16	1.08	0.80	4.78
03/20/11 07:55:16	4740	12.40	3.12	1.10	0.87	4.78
03/20/11 07:55:46	4770	12.40	3.06	1.04	0.95	4.78
03/20/11 07:56:16	4800	12.41	2.94	1.09	0.98	4.78
03/20/11 07:56:46	4830	12.40	2.92	1.02	1.01	4.77
03/20/11 07:57:16	4860	12.41	3.00	1.07	1.06	4.78
03/20/11 07:57:46	4890	12.41	2.99	1.05	1.03	4.77
03/20/11 07:58:16	4920	12.41	3.00	1.09	1.06	4.79
03/20/11 07:58:46	4950	12.40	3.07	1.08	1.14	4.77
03/20/11 07:59:16	4980	12.40	3.08	1.11	1.18	4.79
03/20/11 07:59:46	5010	12.42	3.07	1.12	1.16	4.76
03/20/11 08:00:16	5040	12.42	3.04	1.24	1.22	4.78
03/20/11 08:00:46	5070	12.41	3.04	1.13	1.23	4.76
03/20/11 08:01:16	5100	12.40	3.07	1.07	1.27	4.78
03/20/11 08:01:46	5130	12.40	3.10	1.00	1.29	4.77
03/20/11 08:02:16	5160	12.40	3.12	1.09	1.29	4.78
03/20/11 08:02:46	5190	12.41	3.16	1.07	1.29	4.78
03/20/11 08:03:16	5220	12.40	3.17	1.12	1.29	4.78
03/20/11 08:03:46	5250	12.40	3.15	1.17	1.29	4.78
03/20/11 08:04:16	5280	12.41	3.09	1.03	1.29	4.77
03/20/11 08:04:46	5310	12.42	3.07	1.08	1.29	4.77
03/20/11 08:05:16	5340	12.40	3.05	1.07	1.29	4.77
03/20/11 08:05:46	5370	12.40	3.02	1.14	1.29	4.78
03/20/11 08:06:16	5400	12.39	3.06	1.06	1.29	4.77
03/20/11 08:06:46	5430	12.42	3.05	1.03	1.29	4.78
03/20/11 08:07:16	5460	12.42	3.06	1.09	1.29	4.76
03/20/11 08:07:46	5490	12.41	3.02	1.15	1.29	4.78
03/20/11 08:08:16	5520	12.41	3.01	1.09	1.29	4.76
03/20/11 08:08:46	5550	12.39	3.02	1.08	1.29	4.79
03/20/11 08:09:16	5580	12.39	3.05	1.07	1.29	4.77
03/20/11 08:09:46	5610	12.40	3.06	1.12	1.29	4.79
03/20/11 08:10:16	5640	12.40	3.04	1.03	1.29	4.77

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,904	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,907,620	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	83
Ambient Temperature	61
Specific Humidity	0.009375

Unit Data

Unit Load	257.8	megawatts
Heat Input	2,623	MMBtu/hr
Combustor Inlet Pressure	278	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	10.5	%
Stack Exhaust Flow (M19)	60,557,030	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 08:10:46	5670	12.41	3.05	1.10	1.29	4.79
03/20/11 08:11:16	5700	12.40	2.94	1.07	1.29	4.78
03/20/11 08:11:46	5730	12.40	2.86	1.13	1.29	4.80
03/20/11 08:12:16	5760	12.40	2.83	1.10	1.29	4.78
03/20/11 08:12:46	5790	12.40	2.82	1.14	1.29	4.79
03/20/11 08:13:16	5820	12.40	2.84	1.16	1.29	4.78
03/20/11 08:13:46	5850	12.40	2.86	1.11	1.29	4.78
03/20/11 08:14:16	5880	12.40	2.89	1.18	1.29	4.79
03/20/11 08:14:46	5910	12.40	2.88	1.20	1.29	4.78
03/20/11 08:15:16	5940	12.38	2.82	1.08	1.29	4.81
03/20/11 08:15:46	5970	12.33	2.56	1.21	1.29	4.82
03/20/11 08:16:16	6000	12.34	2.33	1.14	1.29	4.83
03/20/11 08:16:46	6030	12.33	2.34	1.22	0.84	4.82
03/20/11 08:17:16	6060	12.32	2.35	1.21	5.81	4.84
03/20/11 08:17:46	6090	12.33	2.27	1.17	2.58	4.82
03/20/11 08:18:16	6120	12.32	2.13	1.10	2.26	4.84
03/20/11 08:18:46	6150	12.31	2.08	1.06	1.02	4.82
03/20/11 08:19:16	6180	12.31	2.07	1.16	0.68	4.85
03/20/11 08:19:46	6210	12.30	2.05	1.14	0.59	4.83
03/20/11 08:20:16	6240	12.31	2.10	1.20	0.06	4.85
03/20/11 08:20:46	6270	12.31	2.14	1.12	0.29	4.83
03/20/11 08:21:16	6300	12.32	2.12	1.14	0.16	4.84
03/20/11 08:21:46	6330	12.32	2.14	1.18	0.37	4.83
03/20/11 08:22:16	6360	12.33	2.17	1.17	0.09	4.84
03/20/11 08:22:46	6390	12.33	2.23	1.24	0.45	4.83
03/20/11 08:23:16	6420	12.31	2.27	1.14	0.54	4.84
03/20/11 08:23:46	6450	12.31	2.33	1.08	0.60	4.83
03/20/11 08:24:16	6480	12.32	2.40	1.18	1.05	4.85
03/20/11 08:24:46	6510	12.32	2.44	1.09	0.57	4.84
03/20/11 08:25:16	6540	12.32	2.47	1.14	0.99	4.85
03/20/11 08:25:46	6570	12.32	2.50	1.22	1.22	4.83
03/20/11 08:26:16	6600	12.33	2.51	1.15	1.06	4.84
03/20/11 08:26:46	6630	12.33	2.51	1.15	1.10	4.84
03/20/11 08:27:16	6660	12.34	2.54	1.19	1.29	4.83
03/20/11 08:27:46	6690	12.32	2.56	1.10	1.16	4.84
03/20/11 08:28:16	6720	12.34	2.58	1.13	1.17	4.83
03/20/11 08:28:46	6750	12.32	2.51	1.14	1.29	4.85

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,904	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,907,620	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	83
Ambient Temperature	61
Specific Humidity	0.009375

Unit Data

Unit Load	257.8	megawatts
Heat Input	2,623	MMBtu/hr
Combustor Inlet Pressure	278	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	10.5	%
Stack Exhaust Flow (M19)	60,557,030	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/20/11 08:29:16	6780	12.34	2.49	1.15	1.25	4.82
03/20/11 08:29:46	6810	12.36	2.47	1.12	1.27	4.84
03/20/11 08:30:16	6840	12.35	2.41	1.22	1.29	4.82
03/20/11 08:30:46	6870	12.33	2.45	1.11	1.29	4.85
03/20/11 08:31:16	6900	12.31	2.53	1.04	1.27	4.83
03/20/11 08:31:46	6930	12.45	2.60	1.10	1.23	4.83
03/20/11 08:32:16	6960	12.64	2.54	1.04	1.29	4.64
03/20/11 08:32:46	6990	12.56	2.27	1.04	1.02	4.72
03/20/11 08:33:16	7020	12.52	2.29	1.03	0.24	4.74
03/20/11 08:33:46	7050	12.47	2.31	1.13	0.25	4.77
03/20/11 08:34:16	7080	12.44	2.33	0.97	0.31	4.78
03/20/11 08:34:46	7110	12.43	2.36	1.12	0.70	4.78
03/20/11 08:35:16	7140	12.43	2.39	1.15	1.11	4.79
03/20/11 08:35:46	7170	12.41	2.38	1.16	1.14	4.79
03/20/11 08:36:16	7200	12.40	2.38	1.19	1.27	4.81
03/20/11 08:36:46	7230	12.40	2.39	1.14	1.29	4.80
03/20/11 08:37:16	7260	12.40	2.40	1.08	1.28	4.82
03/20/11 08:37:46	7290	12.39	2.41	1.01	1.29	4.80
03/20/11 08:38:16	7320	12.39	2.41	1.13	1.29	4.82
03/20/11 08:38:46	7350	12.39	2.42	1.08	1.29	4.81
03/20/11 08:39:16	7380	12.40	2.39	1.11	1.26	4.82
03/20/11 08:39:46	7410	12.39	2.37	1.01	1.29	4.81
03/20/11 08:40:16	7440	12.39	2.35	1.12	1.29	4.82
03/20/11 08:40:46	7470	12.37	2.32	1.12	1.29	4.83
03/20/11 08:41:16	7500	12.37	2.36	1.09	1.29	4.83
03/20/11 08:41:46	7530	12.36	2.37	1.20	1.29	4.84
03/20/11 08:42:16	7560	12.37	2.36	1.18	1.29	4.83
03/20/11 08:42:46	7590	12.38	2.34	1.19	1.29	4.85
03/20/11 08:43:16	7620	12.38	2.34	1.10	1.29	4.83
03/20/11 08:43:46	7650	12.38	2.34	1.05	1.29	4.85
03/20/11 08:44:16	7680	12.37	2.33	1.08	1.29	4.83
03/20/11 08:44:46	7710	12.37	2.33	1.07	1.29	4.85
03/20/11 08:45:16	7740	12.37	2.36	1.17	1.29	4.83
03/20/11 08:45:46	7770	12.37	2.32	1.20	1.29	4.85
03/20/11 08:46:16	7800	12.39	2.29	1.18	1.29	4.82
03/20/11 08:46:46	7830	12.39	2.23	1.03	1.28	4.84
03/20/11 08:47:16	7860	12.38	2.18	1.15	1.29	4.83

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,904	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,907,620	SCFH

Weather Data

Barometric Pressure	30.23
Relative Humidity	83
Ambient Temperature	61
Specific Humidity	0.009375

Unit Data

Unit Load	257.8	megawatts
Heat Input	2,623	MMBtu/hr
Combustor Inlet Pressure	278	psig
NH_3 Injection Rate	267	lb/hr
Meas. Stack Moisture	10.5	%
Stack Exhaust Flow (M19)	60,557,030	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 08:47:46	7890	12.37	2.15	1.13	1.29	4.85
03/20/11 08:48:16	7920	12.37	2.14	1.06	1.29	4.85
03/20/11 08:48:46	7950	12.36	2.10	1.12	1.29	4.86
03/20/11 08:49:16	7980	12.36	2.12	1.14	1.25	4.87
03/20/11 08:49:46	8010	12.36	2.14	1.22	0.68	4.86
03/20/11 08:50:16	8040	12.39	2.15	1.19	0.50	4.87
03/20/11 08:50:46	8070	12.39	2.14	1.15	1.01	4.86
03/20/11 08:51:16	8100	12.39	2.15	1.07	1.09	4.87
03/20/11 08:51:46	8130	12.35	2.17	1.15	1.13	4.87
RAW AVERAGE		**12.38**	**2.60**	**1.12**	**1.14**	**4.81**

Bias

	O_2	NOx	CO	VOC	CO_2
Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
	(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Initial Zero	0.05	0.11	0.00	-0.15	-0.01
Final Zero	0.18	0.03	-0.18	-0.27	0.06
Avg. Zero	0.12	0.07	-0.09	-0.21	0.03
Initial UpScale	12.24	4.99	5.03	3.09	8.68
Final UpScale	12.31	4.86	5.04	3.00	8.78
Avg. UpScale	12.28	4.93	5.04	3.05	8.73
Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	12.21	2.57	1.16	1.41	4.90
Concentration (ppm@ 15%O_2)	N/A	1.75	0.79	0.96	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.84	0.83	1.01	N/A
Emission Rate (lb/hr)	N/A	18.61	5.10	3.56	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	81.53	22.35	15.58	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.002	0.001	N/A

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,889	lb/min
Duct Burner Fuel Flow	178	lb/min
Total Fuel Flow	2,887,529	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	76
Ambient Temperature	71
Specific Humidity	0.012193

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,605	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	263	lb/hr
Meas. Stack Moisture	10.0	%
Stack Exhaust Flow (M19)	59,966,805	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 09:13:16	9420	12.40	1.97	1.13	0.89	4.88
03/20/11 09:13:46	9450	12.38	2.00	1.15	0.96	4.90
03/20/11 09:14:16	9480	12.38	2.02	1.14	0.97	4.89
03/20/11 09:14:46	9510	12.38	2.06	1.07	0.96	4.91
03/20/11 09:15:16	9540	12.38	2.10	1.10	1.02	4.89
03/20/11 09:15:46	9570	12.35	2.12	1.22	0.99	4.92
03/20/11 09:16:16	9600	12.36	2.15	1.25	0.96	4.90
03/20/11 09:16:46	9630	12.40	2.17	1.35	0.93	4.89
03/20/11 09:17:16	9660	12.39	2.14	1.16	0.90	4.89
03/20/11 09:17:46	9690	12.39	2.16	1.12	0.87	4.90
03/20/11 09:18:16	9720	12.38	2.17	1.21	0.96	4.89
03/20/11 09:18:46	9750	12.35	2.21	1.16	0.98	4.91
03/20/11 09:19:16	9780	12.37	2.27	1.18	0.97	4.91
03/20/11 09:19:46	9810	12.38	2.31	1.18	1.02	4.90
03/20/11 09:20:16	9840	12.39	2.29	1.20	1.04	4.90
03/20/11 09:20:46	9870	12.39	2.22	1.17	1.02	4.88
03/20/11 09:21:16	9900	12.39	2.16	1.15	1.07	4.90
03/20/11 09:21:46	9930	12.38	2.09	1.09	1.06	4.88
03/20/11 09:22:16	9960	12.38	2.05	1.17	1.08	4.91
03/20/11 09:22:46	9990	12.39	2.04	1.19	1.11	4.89
03/20/11 09:23:16	10020	12.39	2.01	1.15	1.10	4.90
03/20/11 09:23:46	10050	12.38	2.01	1.17	1.11	4.89
03/20/11 09:24:16	10080	12.38	2.04	1.12	1.14	4.90
03/20/11 09:24:46	10110	12.38	2.09	1.14	1.12	4.90
03/20/11 09:25:16	10140	12.38	2.12	1.24	1.11	4.89
03/20/11 09:25:46	10170	12.40	2.14	1.17	1.16	4.90
03/20/11 09:26:16	10200	12.39	2.16	1.13	1.17	4.89
03/20/11 09:26:46	10230	12.38	2.19	1.08	1.12	4.91
03/20/11 09:27:16	10260	12.38	2.27	1.20	1.15	4.89
03/20/11 09:27:46	10290	12.40	2.32	1.13	1.14	4.90
03/20/11 09:28:16	10320	12.39	2.34	1.08	1.11	4.89
03/20/11 09:28:46	10350	12.35	2.36	1.08	1.11	4.92
03/20/11 09:29:16	10380	12.35	2.42	1.20	1.14	4.91
03/20/11 09:29:46	10410	12.39	2.44	1.18	1.12	4.91
03/20/11 09:30:16	10440	12.38	2.40	1.21	1.14	4.90
03/20/11 09:30:46	10470	12.37	2.38	1.19	1.19	4.91
03/20/11 09:31:16	10500	12.37	2.36	1.16	1.14	4.91

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,889	lb/min
Duct Burner Fuel Flow	178	lb/min
Total Fuel Flow	2,887,529	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	76
Ambient Temperature	71
Specific Humidity	0.012193

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,605	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	263	lb/hr
Meas. Stack Moisture	10.0	%
Stack Exhaust Flow (M19)	59,966,805	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 09:31:46	10530	12.36	2.38	1.12	2.14	4.91
03/20/11 09:32:16	10560	12.37	2.39	1.11	2.11	4.92
03/20/11 09:32:46	10590	12.35	2.39	1.20	0.89	4.92
03/20/11 09:33:16	10620	12.35	2.38	1.19	0.32	4.93
03/20/11 09:33:46	10650	12.42	2.39	1.16	0.16	4.97
03/20/11 09:34:16	10680	12.46	2.38	1.14	0.25	4.97
03/20/11 09:34:46	10710	12.40	2.30	1.14	0.15	4.89
03/20/11 09:35:16	10740	12.40	2.31	1.25	0.04	4.93
03/20/11 09:35:46	10770	12.36	2.53	1.14	2.46	4.91
03/20/11 09:36:16	10800	12.36	2.61	1.29	2.18	4.94
03/20/11 09:36:46	10830	12.37	2.56	1.23	1.80	4.91
03/20/11 09:37:16	10860	12.39	2.43	1.23	1.66	4.92
03/20/11 09:37:46	10890	12.39	2.32	1.17	0.95	4.90
03/20/11 09:38:16	10920	12.39	2.23	1.22	0.98	4.91
03/20/11 09:38:46	10950	12.36	2.24	1.24	0.91	4.92
03/20/11 09:39:16	10980	12.36	2.33	1.28	0.22	4.92
03/20/11 09:39:46	11010	12.39	2.39	1.24	0.41	4.93
03/20/11 09:40:16	11040	12.40	2.40	1.15	0.53	4.90
03/20/11 09:40:46	11070	12.39	2.40	1.23	0.12	4.92
03/20/11 09:41:16	11100	12.36	2.48	1.24	2.62	4.92
03/20/11 09:41:46	11130	12.35	2.58	1.23	2.75	4.95
03/20/11 09:42:16	11160	12.38	2.64	1.12	1.90	4.92
03/20/11 09:42:46	11190	12.38	2.62	1.14	2.14	4.92
03/20/11 09:43:16	11220	12.39	2.54	1.15	2.45	4.90
03/20/11 09:43:46	11250	12.40	2.48	1.27	1.74	4.91
03/20/11 09:44:16	11280	12.38	2.48	1.09	2.15	4.92
03/20/11 09:44:46	11310	12.39	2.56	1.27	2.01	4.93
03/20/11 09:45:16	11340	12.40	2.53	1.13	1.07	4.94
03/20/11 09:45:46	11370	12.38	2.50	1.21	1.48	4.93
03/20/11 09:46:16	11400	12.39	2.51	1.17	1.44	4.95
03/20/11 09:46:46	11430	12.37	2.49	1.11	0.84	4.93
03/20/11 09:47:16	11460	12.37	2.54	1.12	1.40	4.96
03/20/11 09:47:46	11490	12.37	2.59	1.09	1.01	4.94
03/20/11 09:48:16	11520	12.37	2.60	1.16	0.57	4.96
03/20/11 09:48:46	11550	12.39	2.60	1.07	1.19	4.93
03/20/11 09:49:16	11580	12.40	2.56	1.20	1.08	4.93
03/20/11 09:49:46	11610	12.38	2.53	1.17	0.61	4.93

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,889	lb/min
Duct Burner Fuel Flow	178	lb/min
Total Fuel Flow	2,887,529	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	76
Ambient Temperature	71
Specific Humidity	0.012193

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,605	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	263	lb/hr
Meas. Stack Moisture	10.0	%
Stack Exhaust Flow (M19)	59,966,805	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/20/11 09:50:16	11640	12.37	2.55	1.19	0.99	4.94
03/20/11 09:50:46	11670	12.36	2.57	1.12	0.54	4.96
03/20/11 09:51:16	11700	12.40	2.58	1.23	0.41	4.92
03/20/11 09:51:46	11730	12.40	2.55	1.17	0.83	4.93
03/20/11 09:52:16	11760	12.37	2.50	1.22	0.62	4.93
03/20/11 09:52:46	11790	12.38	2.54	1.15	0.33	4.95
03/20/11 09:53:16	11820	12.41	2.55	1.12	0.69	4.91
03/20/11 09:53:46	11850	12.40	2.51	1.16	0.34	4.94
03/20/11 09:54:16	11880	12.31	2.45	1.24	0.14	4.96
03/20/11 09:54:46	11910	12.31	2.37	1.32	0.42	5.00
03/20/11 09:55:16	11940	12.40	2.41	1.18	0.17	4.93
03/20/11 09:55:46	11970	12.43	2.39	1.11	0.32	4.93
03/20/11 09:56:16	12000	12.41	2.38	1.17	0.26	4.92
03/20/11 09:56:46	12030	12.40	2.38	1.17	0.04	4.93
03/20/11 09:57:16	12060	12.40	2.41	1.17	0.03	4.95
03/20/11 09:57:46	12090	12.39	2.46	1.25	0.20	4.93
03/20/11 09:58:16	12120	12.39	2.49	1.22	0.09	4.95
03/20/11 09:58:46	12150	12.37	2.49	1.20	0.05	4.95
03/20/11 09:59:16	12180	12.37	2.51	1.21	0.52	4.97
03/20/11 09:59:46	12210	12.41	2.50	1.18	0.16	4.94
03/20/11 10:00:16	12240	12.46	2.59	1.17	0.80	4.92
03/20/11 10:00:46	12270	12.46	2.94	1.13	0.72	4.90
03/20/11 10:01:16	12300	12.45	2.97	0.96	1.00	4.91
03/20/11 10:01:46	12330	12.44	3.01	1.12	0.88	4.90
03/20/11 10:02:16	12360	12.43	3.07	1.21	1.57	4.91
03/20/11 10:02:46	12390	12.43	3.11	1.30	1.94	4.91
03/20/11 10:03:16	12420	12.46	3.07	1.11	2.21	4.89
03/20/11 10:03:46	12450	12.46	2.95	1.13	2.63	4.91
03/20/11 10:04:16	12480	12.46	2.86	1.06	1.17	4.89
03/20/11 10:04:46	12510	12.45	2.86	1.14	1.12	4.91
03/20/11 10:05:16	12540	12.45	2.91	1.09	1.05	4.90
03/20/11 10:05:46	12570	12.43	2.96	1.18	0.94	4.92
03/20/11 10:06:16	12600	12.40	3.02	1.03	2.14	4.93
03/20/11 10:06:46	12630	12.46	3.11	1.19	2.14	4.92
03/20/11 10:07:16	12660	12.45	2.94	1.17	2.24	4.91
03/20/11 10:07:46	12690	12.46	2.83	1.24	1.74	4.92
03/20/11 10:08:16	12720	12.48	2.80	1.25	1.59	4.90

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,889	lb/min
Duct Burner Fuel Flow	178	lb/min
Total Fuel Flow	2,887,529	SCFH

Weather Data

Barometric Pressure	30.25
Relative Humidity	76
Ambient Temperature	71
Specific Humidity	0.012193

Unit Data

Unit Load	254.6	megawatts
Heat Input	2,605	MMBtu/hr
Combustor Inlet Pressure	276	psig
NH_3 Injection Rate	263	lb/hr
Meas. Stack Moisture	10.0	%
Stack Exhaust Flow (M19)	59,966,805	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/20/11 10:08:46	12750	12.47	2.79	1.18	1.59	4.90
03/20/11 10:09:16	12780	12.45	2.89	1.08	1.38	4.93
03/20/11 10:09:46	12810	12.45	2.99	0.98	1.17	4.91
03/20/11 10:10:16	12840	12.43	3.08	1.07	1.47	4.94
03/20/11 10:10:46	12870	12.43	3.13	1.18	1.71	4.93
03/20/11 10:11:16	12900	12.48	3.08	1.15	1.13	4.93
03/20/11 10:11:46	12930	12.51	2.91	1.23	1.01	4.89
03/20/11 10:12:16	12960	12.49	2.80	1.13	0.62	4.92
03/20/11 10:12:46	12990	12.43	2.79	1.14	0.84	4.93
RAW AVERAGE		**12.40**	**2.48**	**1.17**	**1.08**	**4.92**

	O_2	**NOx**	**CO**	**VOC**	**CO_2**
Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
	(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Initial Zero	0.18	0.03	-0.18	-0.27	0.06
Final Zero	0.16	0.07	-0.01	0.01	0.12
Avg. Zero	0.17	0.05	-0.10	-0.13	0.09
Bias					
Initial UpScale	12.31	4.86	5.04	3.00	8.78
Final UpScale	12.32	4.88	5.08	3.00	8.80
Avg. UpScale	12.32	4.87	5.06	3.00	8.79
Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	12.18	2.49	1.20	1.32	4.94
Concentration (ppm@ 15%O_2)	N/A	1.68	0.82	0.89	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.82	0.88	0.96	N/A
Emission Rate (lb/hr)	N/A	17.82	5.25	3.28	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	78.06	23.00	14.38	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.002	0.001	N/A

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,855	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,839,248	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	55
Ambient Temperature	80
Specific Humidity	0.011897

Unit Data

Unit Load	249.1	megawatts
Heat Input	2,562	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	248	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,172,805	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 10:26:16	13800	12.49	3.02	1.32	0.52	4.91
03/20/11 10:26:46	13830	12.47	2.89	1.42	0.50	4.94
03/20/11 10:27:16	13860	12.52	2.94	1.27	0.62	4.91
03/20/11 10:27:46	13890	12.53	2.91	1.33	0.61	4.90
03/20/11 10:28:16	13920	12.49	2.97	1.23	0.44	4.91
03/20/11 10:28:46	13950	12.43	3.03	1.36	0.50	4.96
03/20/11 10:29:16	13980	12.44	3.26	1.24	0.63	4.95
03/20/11 10:29:46	14010	12.43	3.33	1.26	0.63	4.94
03/20/11 10:30:16	14040	12.46	3.22	1.31	0.56	4.95
03/20/11 10:30:46	14070	12.46	3.06	1.46	0.36	4.93
03/20/11 10:31:16	14100	12.49	2.83	1.37	0.01	4.94
03/20/11 10:31:46	14130	12.49	2.65	1.46	0.23	4.91
03/20/11 10:32:16	14160	12.48	2.60	1.41	0.49	4.94
03/20/11 10:32:46	14190	12.46	2.66	1.34	0.57	4.93
03/20/11 10:33:16	14220	12.48	2.77	1.39	0.63	4.92
03/20/11 10:33:46	14250	12.52	2.79	1.28	0.77	4.91
03/20/11 10:34:16	14280	12.53	2.77	1.22	0.77	4.87
03/20/11 10:34:46	14310	12.56	2.76	1.24	0.82	4.88
03/20/11 10:35:16	14340	12.53	2.81	1.21	0.86	4.88
03/20/11 10:35:46	14370	12.46	2.93	1.16	0.80	4.93
03/20/11 10:36:16	14400	12.43	3.12	1.25	0.74	4.95
03/20/11 10:36:46	14430	12.41	3.26	1.40	0.81	4.96
03/20/11 10:37:16	14460	12.43	3.34	1.39	0.83	4.97
03/20/11 10:37:46	14490	12.48	3.20	1.37	0.84	4.92
03/20/11 10:38:16	14520	12.54	2.92	1.40	0.88	4.90
03/20/11 10:38:46	14550	12.54	2.66	1.47	0.89	4.88
03/20/11 10:39:16	14580	12.49	2.56	1.42	0.82	4.94
03/20/11 10:39:46	14610	12.45	2.66	1.37	0.82	4.95
03/20/11 10:40:16	14640	12.43	2.86	1.42	0.91	4.98
03/20/11 10:40:46	14670	12.51	2.97	1.40	0.94	4.94
03/20/11 10:41:16	14700	12.51	2.91	1.40	0.94	4.94
03/20/11 10:41:46	14730	12.61	2.85	1.33	1.06	4.91
03/20/11 10:42:16	14760	12.63	2.76	1.35	0.99	4.87
03/20/11 10:42:46	14790	12.57	2.68	1.43	0.52	4.92
03/20/11 10:43:16	14820	12.62	2.79	1.26	0.45	4.89
03/20/11 10:43:46	14850	12.63	2.88	1.24	0.28	4.89
03/20/11 10:44:16	14880	12.57	2.94	1.29	0.28	4.90

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,855	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,839,248	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	55
Ambient Temperature	80
Specific Humidity	0.011897

Unit Data

Unit Load	249.1	megawatts
Heat Input	2,562	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	248	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,172,805	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 10:44:46	14910	12.50	3.03	1.33	0.46	4.96
03/20/11 10:45:16	14940	12.45	3.14	1.25	0.36	4.98
03/20/11 10:45:46	14970	12.46	3.22	1.39	0.34	4.98
03/20/11 10:46:16	15000	12.54	3.31	1.31	0.51	4.96
03/20/11 10:46:46	15030	12.46	3.17	1.24	0.44	4.96
03/20/11 10:47:16	15060	12.52	3.15	1.30	0.44	4.96
03/20/11 10:47:46	15090	12.62	3.08	1.26	0.48	4.91
03/20/11 10:48:16	15120	12.61	2.80	1.29	0.37	4.91
03/20/11 10:48:46	15150	12.58	2.44	1.26	0.37	4.91
03/20/11 10:49:16	15180	12.56	2.46	1.20	0.42	4.91
03/20/11 10:49:46	15210	12.48	2.55	1.21	1.20	4.96
03/20/11 10:50:16	15240	12.43	2.64	1.20	1.03	4.98
03/20/11 10:50:46	15270	12.39	2.72	1.31	0.65	5.02
03/20/11 10:51:16	15300	12.42	2.81	1.33	0.78	5.00
03/20/11 10:51:46	15330	12.44	2.73	1.19	0.36	4.99
03/20/11 10:52:16	15360	12.44	2.56	1.28	0.41	4.98
03/20/11 10:52:46	15390	12.40	2.36	1.34	0.43	5.02
03/20/11 10:53:16	15420	12.47	2.27	1.40	0.04	5.00
03/20/11 10:53:46	15450	12.51	2.13	1.26	0.00	4.94
03/20/11 10:54:16	15480	12.51	2.03	1.30	0.15	4.97
03/20/11 10:54:46	15510	12.49	2.03	1.33	0.06	4.96
03/20/11 10:55:16	15540	12.44	2.10	1.32	0.25	4.98
03/20/11 10:55:46	15570	12.39	2.19	1.39	0.23	5.02
03/20/11 10:56:16	15600	12.40	2.34	1.56	0.40	5.03
03/20/11 10:56:46	15630	12.38	2.41	1.34	0.60	5.05
03/20/11 10:57:16	15660	12.45	2.37	1.40	0.66	5.01
03/20/11 10:57:46	15690	12.63	2.31	1.41	0.68	4.93
03/20/11 10:58:16	15720	12.63	2.11	1.63	0.74	4.89
03/20/11 10:58:46	15750	12.55	2.12	1.64	0.19	4.96
03/20/11 10:59:16	15780	12.59	2.21	1.50	0.60	4.94
03/20/11 10:59:46	15810	12.57	2.31	1.47	0.79	4.95
03/20/11 11:00:16	15840	12.59	2.35	1.33	0.85	4.95
03/20/11 11:00:46	15870	12.62	2.37	1.38	0.11	4.90
03/20/11 11:01:16	15900	12.60	2.36	1.27	0.70	4.94
03/20/11 11:01:46	15930	12.65	2.49	1.22	0.92	4.89
03/20/11 11:02:16	15960	12.59	2.54	1.23	0.84	4.93
03/20/11 11:02:46	15990	12.52	2.63	1.27	0.62	4.96

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,855	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,839,248	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	55
Ambient Temperature	80
Specific Humidity	0.011897

Unit Data

Unit Load	249.1	megawatts
Heat Input	2,562	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	248	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,172,805	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 11:03:16	16020	12.56	2.76	1.14	0.56	4.96
03/20/11 11:03:46	16050	12.57	2.76	1.24	0.85	4.94
03/20/11 11:04:16	16080	12.49	2.70	1.27	0.91	4.99
03/20/11 11:04:46	16110	12.48	2.73	1.16	1.00	5.02
03/20/11 11:05:16	16140	12.53	2.80	1.10	1.01	4.99
03/20/11 11:05:46	16170	12.49	2.81	1.22	0.94	5.02
03/20/11 11:06:16	16200	12.54	2.83	1.17	1.03	4.97
03/20/11 11:06:46	16230	12.61	2.77	1.05	1.04	4.96
03/20/11 11:07:16	16260	12.62	2.66	1.10	1.01	4.93
03/20/11 11:07:46	16290	12.58	2.59	1.06	1.09	4.95
03/20/11 11:08:16	16320	12.52	2.64	1.06	1.10	4.99
03/20/11 11:08:46	16350	12.43	2.71	1.20	1.02	5.03
03/20/11 11:09:16	16380	12.44	2.74	1.30	1.04	5.04
03/20/11 11:09:46	16410	12.46	2.68	1.30	1.09	5.00
03/20/11 11:10:16	16440	12.45	2.52	1.47	1.03	5.02
03/20/11 11:10:46	16470	12.49	2.41	1.43	1.03	5.00
03/20/11 11:11:16	16500	12.50	2.25	1.37	1.12	4.99
03/20/11 11:11:46	16530	12.60	2.13	1.38	1.13	4.95
03/20/11 11:12:16	16560	12.52	2.02	1.48	1.08	4.96
03/20/11 11:12:46	16590	12.44	2.05	1.54	1.08	5.04
03/20/11 11:13:16	16620	12.41	2.01	1.55	1.02	5.04
03/20/11 11:13:46	16650	12.41	2.04	1.51	1.03	5.05
03/20/11 11:14:16	16680	12.43	2.10	1.48	1.07	5.05
03/20/11 11:14:46	16710	12.53	2.08	1.45	1.05	4.98
03/20/11 11:15:16	16740	12.57	1.99	1.38	1.08	4.97
03/20/11 11:15:46	16770	12.55	1.92	1.40	0.42	4.95
03/20/11 11:16:16	16800	12.52	1.92	1.39	0.88	4.99
03/20/11 11:16:46	16830	12.48	2.01	1.43	0.79	5.01
03/20/11 11:17:16	16860	12.46	2.10	1.35	0.50	5.03
03/20/11 11:17:46	16890	12.46	2.18	1.43	0.98	5.03
03/20/11 11:18:16	16920	12.47	2.26	1.29	0.98	5.02
03/20/11 11:18:46	16950	12.47	2.28	1.26	0.72	5.03
03/20/11 11:19:16	16980	12.46	2.23	1.37	0.84	5.02
03/20/11 11:19:46	17010	12.53	2.18	1.35	1.09	5.00
03/20/11 11:20:16	17040	12.52	2.08	1.26	1.13	4.98
03/20/11 11:20:46	17070	12.50	2.03	1.28	1.15	5.00
03/20/11 11:21:16	17100	12.50	2.10	1.38	1.13	5.02

Florida Power and Light
March 20, 2011
Mitsubishi, 501G, Unit 3B
West County Energy Center

Fuel Data

Fuel Fd factor	8,654	SCF exh/MMBtu
Fuel Heating Value (HHV)	1,001	Btu/SCF fuel
Turbine Fuel Flow	1,855	lb/min
Duct Burner Fuel Flow	177	lb/min
Total Fuel Flow	2,839,248	SCFH

Weather Data

Barometric Pressure	30.27
Relative Humidity	55
Ambient Temperature	80
Specific Humidity	0.011897

Unit Data

Unit Load	249.1	megawatts
Heat Input	2,562	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	248	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,172,805	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/20/11 11:21:46	17130	12.50	2.17	1.24	0.94	4.99
03/20/11 11:22:16	17160	12.48	2.23	1.25	0.71	5.03
03/20/11 11:22:46	17190	12.46	2.30	1.28	1.01	5.02
03/20/11 11:23:16	17220	12.47	2.32	1.36	1.07	5.03
03/20/11 11:23:46	17250	12.54	2.32	1.26	1.17	4.99
03/20/11 11:24:16	17280	12.52	2.22	1.25	1.18	4.98
03/20/11 11:24:46	17310	12.46	2.20	1.39	1.13	5.04
03/20/11 11:25:16	17340	12.43	2.25	1.38	1.13	5.04
03/20/11 11:25:46	17370	12.47	2.33	1.33	1.22	5.05
RAW AVERAGE		**12.50**	**2.57**	**1.33**	**0.74**	**4.97**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0012	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	0.16	0.07	-0.01	0.01	0.12
	Final Zero	0.34	0.06	-0.22	0.00	0.16
	Avg. Zero	0.25	0.07	-0.12	0.01	0.14
	Initial UpScale	12.32	4.88	5.08	3.00	8.80
	Final UpScale	12.46	4.80	5.09	2.88	8.86
	Avg. UpScale	12.39	4.84	5.09	2.94	8.83
Upscale Cal Gas		12.10	4.93	4.92	3.10	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.21	2.59	1.36	0.85	4.95
Concentration (ppm@ 15%O_2)	N/A	1.76	0.93	0.58	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.84	0.97	0.60	N/A
Emission Rate (lb/hr)	N/A	18.30	5.86	2.09	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	80.16	25.68	9.14	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.002	0.001	N/A

TEST RESULTS

NH_3 Emissions
Base Load

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3B
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/19/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3B	
Base Run Number		Base	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		1	2	3	
Test Date	(mm/dd/yy)	03/19/11	03/19/11	03/19/11	
Load	% or w/DB	Base	Base	Base	
Fuel F-Factor		8642.84	8642.84	8642.84	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	($\Delta H_@$)	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

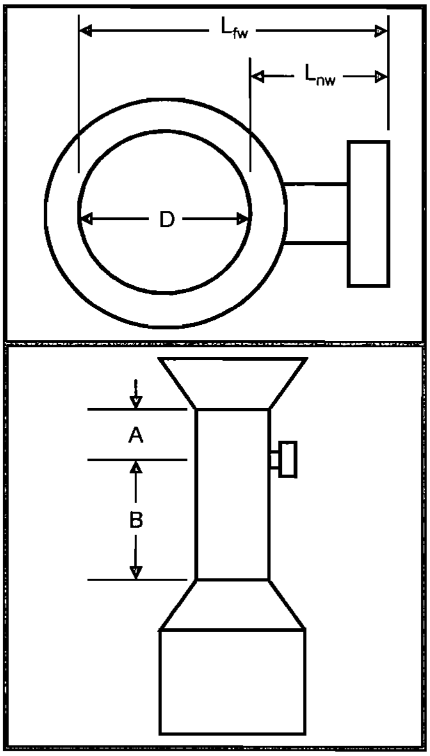
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/19/11
Sampling Location	Unit 3B	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²

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[1] 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

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

● Method 1 Tra ○ 12 Point PM Trav ○ Veloci

Location of Traverse Points In Circular Stacks									
Traverse	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.862	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center			
Sampling Location	Unit 3B			
Operator	TG			
Project #	bv-10-westcounty.fl-comp#2			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/19/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft²
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.45	%vd
Oxygen Concentration	(%O_2)	13.10	%vd
Carbon Monoxide Concentration	(ppmCO)	0.59	ppmvd
Nitrogen Concentration	(%N_2)	82.45	%vd
Stack Moisture Content	(B_{ws})	9.43	%
Stack Dry Molecular Weight	(M_d)	29.24	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.18	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	62.40	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	60,636,917	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	1,010,615	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,416,643	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	66,950,333	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):

If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number		Base-V1		
Run Time	08:49	**Start**	09:23	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(i)}$)
	in H_2O	deg	°F	ft/sec
A-1	0.94	0	221	62.19
A-2	0.87	0	221	59.83
A-3	0.82	0	220	58.05
A-4	0.72	0	220	54.39
A-5	0.64	0	219	51.24
A-6	0.46	0	217	43.38
B-1	0.71	0	214	53.77
B-2	0.82	0	214	57.79
B-3	0.80	0	213	57.04
B-4	0.76	0	211	55.51
B-5	0.69	0	211	52.89
B-6	0.45	0	209	42.65
C-1	0.96	0	219	62.76
C-2	1.20	0	219	70.17
C-3	1.30	0	217	72.93
C-4	1.40	0	217	75.68
C-5	1.40	0	217	75.68
C-6	1.20	0	216	70.01
D-1	0.92	0	222	61.57
D-2	1.20	0	228	70.63
D-3	1.30	0	227	73.46
D-4	1.40	0	227	76.24
D-5	1.40	0	226	76.18
D-6	1.00	0	221	64.15
Average	0.97	0	219	
	0.97	= Square roots of Δp		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/19/11		
Sampling Location	Unit 3B	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data

Run Number	Base-1		**Run Start Time**		09:34	**Run Stop Time**	10:46	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	($(F_o)_{avg}$)	($(\%EA)_{avg}$)	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:12	4.5	13.1	0.6	82.4	29.25	1.724	151.2	YES

Gas Analysis Data

Run Number	Base-2		**Run Start Time**		10:56	**Run Stop Time**	12:08	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	($(F_o)_{avg}$)	($(\%EA)_{avg}$)	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:12	4.4	13.1	0.6	82.5	29.23	1.767	150.7	YES

Gas Analysis Data

Run Number	Base-3		**Run Start Time**		12:22	**Run Stop Time**	13:35	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	($(F_o)_{avg}$)	($(\%EA)_{avg}$)	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:13	4.4	13.1	0.6	82.5	29.23	1.762	152.0	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/19/11
Sampling Location	Unit 3B	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data									
Run Number		Base-1		**Run Start Time**		09:34	**Run Stop Time**		10:46
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.050	dcf	**Barometric Pressure**		(P_b)	30.23	in Hg
Average Stack Temp		$(t_s)_{avg}$	219	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	89	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.94	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	817.90	786.90	620.50	839.70				
Initial Value	$(V_i),(W_i)$	754.00	766.60	614.80	827.90				
Net Value	$(V_n),(W_n)$	63.9	20.3	5.7	11.8				
Results									
Total Weight		(W_t)	101.70	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.795	scf
Std Meter Volume		$(V_{m(std)})$	45.531	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.53	%	**Final Moisture Content**		(B_{ws})	9.53	%

Moisture Content Data									
Run Number		Base-2		**Run Start Time**		10:56	**Run Stop Time**		12:08
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.890	dcf	**Barometric Pressure**		(P_b)	30.23	in Hg
Average Stack Temp		$(t_s)_{avg}$	224	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	93	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.94	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	824.00	802.50	615.50	840.80				
Initial Value	$(V_i),(W_i)$	759.80	784.10	609.90	828.00				
Net Value	$(V_n),(W_n)$	64.2	18.4	5.6	12.8				
Results									
Total Weight		(W_t)	101.00	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.762	scf
Std Meter Volume		$(V_{m(std)})$	45.980	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.39	%	**Final Moisture Content**		(B_{ws})	9.39	%

Moisture Content Data									
Run Number		Base-3		**Run Start Time**		12:22	**Run Stop Time**		13:35
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.180	dcf	**Barometric Pressure**		(P_b)	30.25	in Hg
Average Stack Temp		$(t_s)_{avg}$	222	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	91	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.90	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	806.00	793.60	619.10	849.60				
Initial Value	$(V_i),(W_i)$	733.60	779.70	615.30	839.70				
Net Value	$(V_n),(W_n)$	72.4	13.9	3.8	9.9				
Results									
Total Weight		(W_t)	100.00	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.715	scf
Std Meter Volume		$(V_{m(std)})$	45.526	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.38	%	**Final Moisture Content**		(B_{ws})	9.38	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Date	03/19/11
Operator	TG
Run Number	Base-1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	218.6	°F
Average Meter Temp	(t_m)	88.9	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.97	in H_2O
Stack Moisture Content	(B_{ws})	9.53	%
Stack Dry Molecular Weight	(M_d)	29.25	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	2.01	

Leak Checks					
Train	**Pre**	0.000	ft^3/min@	15.0	in Hg
PASS	**Post**	0.000	ft^3/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	5.0	In H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	In H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2120	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg
Absolute Meter Pressure	(P_m)	30.36	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	09:34	**End**	10:46

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	754.0	766.6	614.8	827.9				
Post	817.9	786.9	620.5	839.7				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft^3	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	706.790	0.94	1.887	1.90	221	255	254	68			83	82	3.0	0.97	62.19	1.929	101.0	46.288
46682288222	2.5	00:02:30	708.760	0.87	1.747	1.70	221	252	254	62			85	81	1.0	0.93	59.83	3.776	100.8	45.317
A-3	5.0	00:05:00	710.650	0.82	1.646	1.60	220	255	254	61			87	81	2.0	0.91	58.05	5.493	99.3	43.947
A-4	7.5	00:07:30	712.410	0.72	1.446	1.40	220	254	254	62			89	83	2.0	0.85	54.39	7.194	99.9	43.162
A-5	10.0	00:10:00	714.160	0.64	1.285	1.30	219	254	254	64			88	84	1.0	0.80	51.24	8.787	100.1	42.178
A-6	12.5	00:12:30	715.800	0.46	0.924	0.90	217	255	256	63			87	83	1.0	0.68	43.38	10.138	100.2	40.552
B-1	15.0	00:15:00	717.190	0.71	1.425	1.40	214	246	251	68			85	84	2.0	0.84	53.77	11.745	99.6	40.270
B-2	17.5	00:17:30	718.840	0.82	1.646	1.60	214	247	254	66			89	84	2.0	0.91	57.79	13.746	101.4	41.238
B-3	20.0	00:20:00	720.900	0.80	1.606	1.60	213	252	254	65			92	83	2.0	0.89	57.04	15.219	99.6	40.585
B-4	22.5	00:22:30	722.420	0.76	1.526	1.50	211	252	255	65			94	84	2.0	0.87	55.51	16.872	99.2	40.493
B-5	25.0	00:25:00	724.130	0.69	1.385	1.40	211	250	256	67			94	84	2.0	0.83	52.89	18.524	99.3	40.417
B-6	27.5	00:27:30	725.840	0.45	0.903	0.89	209	249	257	65			91	85	1.0	0.67	42.65	19.878	99.4	39.756
C-1	30.0	00:30:00	727.240	0.96	1.927	1.90	219	252	257	68			91	86	2.0	0.98	62.76	21.776	99.3	40.201
C-2	32.5	00:32:30	729.200	1.20	2.409	2.40	219	255	257	61			95	86	3.0	1.10	70.17	23.872	99.1	40.923
C-3	35.0	00:35:00	731.370	1.30	2.810	2.60	217	253	258	63			94	87	3.0	1.14	72.93	26.008	98.8	41.612
C-4	37.5	00:37:30	733.580	1.40	2.811	2.80	217	250	254	61			95	87	3.0	1.18	75.68	28.249	98.5	42.373
C-5	40.0	00:40:00	735.900	1.40	2.811	2.80	217	250	258	61			97	88	3.0	1.18	75.68	30.493	98.4	43.050
C-6	42.5	00:42:30	738.230	1.20	2.409	2.40	216	251	258	61			98	88	3.0	1.10	70.01	32.609	98.3	43.479
D-1	45.0	00:45:00	740.430	0.92	1.647	1.80	222	252	258	68			92	90	2.0	0.96	61.57	34.450	98.3	43.515
D-2	47.5	00:47:30	742.340	1.20	2.409	2.40	228	252	258	61			96	89	3.0	1.10	70.63	36.577	98.3	43.892
D-3	50.0	00:50:00	744.550	1.30	2.610	2.60	227	252	256	60			95	90	3.0	1.14	73.46	38.811	98.4	44.355
D-4	52.5	00:52:30	746.870	1.40	2.811	2.80	227	254	258	61			96	90	3.0	1.18	76.24	41.149	98.5	44.890
D-5	55.0	00:55:00	749.300	1.40	2.811	2.80	226	252	258	61			96	90	3.0	1.18	76.18	43.479	98.6	45.369
D-6	57.5	00:57:30	751.720	1.00	2.008	2.00	221	252	257	82			98	90	2.0	1.00	84.15	45.512	98.8	45.512
Last Pt	60.0	01:00:00	753.840																	
Final Val	60.0	01:00:00	753.840											Max Vac	3.0	Final Values		45.512	98.8	
Average Values				0.97		1.94	219	252	256	64			92	86		0.97	62.43			
													89							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	*Unit 3B*
Project #	bv-10-westcounty.fl-comp#2

Date	03/19/11
Operator	TG
Run Number	Base-2

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	223.7	°F
Average Meter Temp	(t_m)	93.2	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.97	in H_2O
Stack Moisture Content	(B_{ws})	9.39	%
Stack Dry Molecular Weight	(M_d)	29.23	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.76	acfm
ΔP to ΔH Isokinetic Factor	(K)	2.01	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	***Post***	0.000	*ft³/min@*	15.0	*in Hg*
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2130	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg
Absolute Meter Pressure	(P_m)	30.36	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	10:56	**End**	12:08

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	759.8	784.1	609.9	828.0				
Post	824.0	802.5	615.5	840.8				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	754.130	1.00	2.014	2.00	229	252	257	68			92	90	2.0	1.00	64.52	1.919	97.8	46.047
A-2	2.5	00:02:30	756.120	1.20	2.416	2.40	231	253	258	67			98	90	3.0	1.10	70.79	4.126	100.5	49.515
A-3	5.0	00:05:00	758.420	1.30	2.618	2.60	229	252	258	64			99	91	3.0	1.14	73.57	6.312	99.5	50.495
A-4	7.5	00:07:30	760.700	1.40	2.819	2.80	228	251	257	65			99	92	3.0	1.18	76.29	8.420	97.3	50.519
A-5	10.0	00:10:00	762.900	1.40	2.819	2.80	228	252	255	65			100	93	3.0	1.18	76.29	10.275	94.2	49.322
A-6	12.5	00:12:30	764.840	1.10	2.215	2.20	224	252	259	64			101	92	3.0	1.05	67.43	12.902	100.9	51.607
B-1	15.0	00:15:00	767.590	0.90	1.812	1.80	223	254	255	68			94	92	2.0	0.95	60.95	14.88D	101.6	51.017
B-2	17.5	00:17:30	769.650	0.93	1.873	1.90	225	238	252	67			95	93	2.0	0.96	62.04	16.836	101.7	50.507
B-3	20.0	00:20:00	771.690	1.20	2.416	2.40	222	260	254	61			96	92	3.0	1.10	70.32	18.947	101.3	50.526
B-4	22.5	00:22:30	773.890	1.30	2.618	2.60	221	249	256	61			96	92	3.0	1.14	73.14	21.146	100.9	50.751
B-5	25.0	00:25:00	776.180	1.40	2.819	2.80	220	243	252	63			96	92	3.0	1.18	75.85	23.510	100.9	51.294
B-6	27.5	00:27:30	778.640	1.10	2.215	2.20	216	231	254	64			95	92	3.0	1.05	87.03	25.555	100.7	51.110
C-1	30.0	00:30:00	780.770	0.73	1.470	1.50	223	266	255	66			90	90	2.0	0.85	54.89	27.272	100.8	50.349
C-2	32.5	00:32:30	782.550	0.82	1.651	1.70	221	271	258	61			95	90	2.0	0.91	58.09	29.050	100.7	49.800
C-3	35.0	00:35:00	784.400	0.80	1.611	1.60	218	264	255	64			96	92	2.0	0.89	57.25	30.841	100.8	49.346
C-4	37.5	00:37:30	786.270	0.75	1.510	1.50	217	262	255	61			94	91	2.0	0.87	55.39	32.570	100.8	48.855
C-5	40.0	00:40:00	788.070	0.68	1.369	1.40	216	267	257	61			93	90	2.0	0.82	52.70	34.205	100.7	48.290
C-6	42.5	00:42:30	789.770	0.45	0.906	0.91	213	258	249	59			95	90	1.0	0.67	42.78	35.557	100.8	47.410
D-1	45.0	00:45:00	791.180	0.79	1.591	1.60	227	249	249	68			93	92	2.0	0.89	57.27	37.306	100.7	47.123
D-2	47.5	00:47:30	793.000	0.86	1.732	1.70	229	249	245	60			95	92	2.0	0.93	59.84	39.118	100.7	46.942
D-3	50.0	00:50:00	794.890	0.78	1.571	1.60	227	249	244	59			93	92	2.0	0.88	56.90	40.790	100.5	46.617
D-4	52.5	00:52:30	796.630	0.78	1.571	1.60	227	251	245	58			93	90	2.0	0.88	56.90	42.666	100.8	46.545
D-5	55.0	00:55:00	798.580	0.73	1.470	1.50	227	247	248	60			93	91	2.0	0.85	55.05	44.512	101.2	46.447
D-6	57.5	00:57:30	800.500	0.68	1.369	1.40	227	246	245	61			93	90	2.0	0.82	53.13	45.974	100.9	45.974
Lest Pt	60.0	01:00:00	802.020																	
Final Val	60.0	01:00:00	802.020											**Max Vac**	3.0	**Final Values**		45.974	100.9	
Average Values				0.96		1.94	224	253	253	63			95	91		0.97	62.43			
													93							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Date	03/19/11
Operator	TG
Run Number	Base-3

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	221.5	°F
Average Meter Temp	(t_m)	90.8	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.96	in H_2O
Stack Moisture Content	(B_{ws})	9.38	%
Stack Dry Molecular Weight	(M_d)	29.23	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.77	acfm
ΔP to ΔH Isokinetic Factor	(K)	2.01	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2148	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg
Absolute Meter Pressure	(P_m)	30.38	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	12:22	**End**	13:35

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	733.6	779.7	615.3	839.7				
Post	806.0	793.6	619.1	849.6				

Wash Volumes					ml
					ml

Note: Unit trip ~13:30, during last port change. Testing resumed at ~18:30

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	802.310	1.00	2.011	2.00	226	248	252	68			92	89	2.0	1.00	64.36	2.115	107.5	50.755
A-2	2.5	00:02:30	804.500	0.95	1.910	1.90	227	236	244	65			95	90	2.0	0.97	62.78	4.231	109.0	50.772
A-3	5.0	00:05:00	806.700	1.20	2.413	2.40	228	232	246	61			95	91	3.0	1.10	70.61	6.001	101.1	48.012
A-4	7.5	00:07:30	808.540	1.20	2.413	2.40	227	243	243	62			94	90	3.0	1.10	70.56	8.132	100.6	48.791
A-5	10.0	00:10:00	810.750	1.40	2.815	2.80	227	246	252	64			94	90	3.0	1.18	76.21	10.448	100.3	50.148
A-6	12.5	00:12:30	813.150	1.30	2.614	2.60	224	242	246	65			94	90	3.0	1.14	73.28	12.666	100.1	50.663
B-1	15.0	00:15:00	815.450	0.89	1.790	1.80	220	237	254	68			90	91	2.0	0.94	60.45	14.644	100.9	50.209
B-2	17.5	00:17:30	817.500	1.20	2.413	2.40	220	239	248	66			94	89	3.0	1.10	70.20	16.912	101.4	50.735
B-3	20.0	00:20:00	819.850	1.20	2.413	2.40	217	237	255	67			94	89	3.0	1.10	70.04	18.986	100.8	50.630
B-4	22.5	00:22:30	822.000	1.30	2.614	2.60	217	239	249	65			93	89	3.0	1.14	72.90	20.957	99.5	50.297
B-5	25.0	00:25:00	824.040	1.30	2.614	2.60	216	236	243	62			94	90	3.0	1.14	72.85	23.195	99.5	50.606
B-6	27.5	00:27:30	826.360	1.10	2.212	2.20	214	235	248	61			93	90	2.0	1.05	66.91	25.297	99.6	50.594
C-1	30.0	00:30:00	828.540	0.69	1.388	1.40	219	246	251	67			90	90	2.0	0.83	53.19	26.957	99.7	49.767
C-2	32.5	00:32:30	830.260	0.80	1.609	1.60	217	242	252	59			92	89	2.0	0.89	57.19	28.693	99.6	49.189
C-3	35.0	00:35:00	832.060	0.78	1.569	1.60	215	244	248	58			92	89	2.0	0.88	56.39	30.488	99.8	48.780
C-4	37.5	00:37:30	833.920	0.76	1.528	1.50	214	237	246	59			92	89	2.0	0.87	55.62	32.195	99.7	48.292
C-5	40.0	00:40:00	835.690	0.74	1.488	1.50	214	250	248	60			91	89	2.0	0.86	54.88	33.894	99.7	47.850
C-6	42.5	00:42:30	837.450	0.52	1.046	1.00	213	235	251	61			91	89	1.0	0.72	45.97	35.340	99.7	47.120
D-1	45.0	00:45:00	838.950	0.82	1.649	1.70	228	235	251	68			90	89	2.0	0.91	58.37	37.322	100.4	47.144
D-2	47.5	00:47:30	841.000	0.85	1.709	1.70	230	235	245	61			91	88	2.0	0.92	59.51	38.985	100.0	46.782
D-3	50.0	00:50:00	842.720	0.79	1.589	1.60	229	236	242	62			91	88	2.0	0.69	57.33	40.724	100.0	46.542
D-4	52.5	00:52:30	844.520	0.81	1.829	1.60	228	239	243	63			90	88	2.0	0.90	58.01	42.504	100.0	46.368
D-5	55.0	00:55:00	846.360	0.72	1.448	1.50	227	235	245	65			92	88	2.0	0.85	54.65	44.097	99.9	46.014
D-6	57.5	00:57:30	848.010	0.42	0.845	0.84	220	231	243	66			91	88	1.0	0.65	41.53	45.525	100.2	45.525
Last Pt	60.0	01:00:00	849.490	\	#VALUE!															
Final Val	60.0		849.490											Max Vac	3.0	Final Values		45.525	100.2	
Average Values				0.95		1.90	222	239	246	63			92	89		0.96	61.82			
													91							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/19/11
Sampling Location	Unit 3B	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data				
Run Number	Base-1	Base-2	Base-3	
Run Start Time	09:34	10:56	12:22	(hh:mm)
Run Stop Time	10:46	12:08	13:35	(hh:mm)
Train Prepared By	AS	AS	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/19/11	03/19/11	03/19/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/19/11	03/19/11	03/19/11	(mm/dd/yy)
Relinquished Time	10:46	12:08	13:35	(hh:mm)

Equipment Identification Numbers			
Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Weight					
Final Weight	(W_f)	2225.3	2242.0	2218.7	g
Initial Weight	(W_i)	2135.4	2153.8	2128.6	g
Net Weight	(W_n)	89.9	88.2	90.1	g
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W_f)	839.7	840.8	849.6	g
Initial Weight	(W_i)	827.9	828.0	839.7	g
Net Weight	(W_n)	11.8	12.8	9.9	g
Comments					
Total Water Collected					
Total Weight	(W_{lc})	101.7	101.0	100.0	g
Total Volume	(V_{lc})	101.9	101.2	100.2	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Run Start Time	09:34	10:56	12:22		hh:mm
Run Stop Time	10:46	12:08	13:35		hh:mm
Test Date	03/19/11	03/19/11	03/19/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Initial Meter Volume	706.790	754.130	802.310		ft^3
Final Meter Volume	753.840	802.020	849.490		ft^3
Total Meter Volume	47.050	47.890	47.180	47.373	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	88.88	93.23	90.77	90.96	°F
Average Stack Temperature	218.58	223.67	221.54	221.26	°F
Barometric Pressure	30.23	30.23	30.25	30.24	in Hg
Stack Static Pressure	0.79	0.79	0.79	0.79	in H_2O
Absolute Stack Pressure	30.29	30.29	30.31	30.29	in Hg
Average Orifice Pressure Drop	1.94	1.94	1.90	1.93	in H_2O
Absolute Meter Pressure	30.36	30.36	30.38	30.36	in Hg
Avg Square Root Pitot Pressure	0.97	0.97	0.96	0.97	$\sqrt{(\text{in } H_2O)}$
Moisture Content Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Impinger Water Weight Gain	89.90	88.20	90.10	89.40	g
Silica Gel Weight Gain	11.80	12.80	9.90	11.50	g
Total Water Volume Collected	101.88	101.18	100.18	101.08	ml
Standard Water Vapor Volume	4.80	4.76	4.72	4.76	scf
Standard Meter Volume	45.5	46.0	45.5	45.7	dscf
Calculated Stack Moisture	9.53	9.39	9.38	9.43	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	9.53	9.39	9.38	9.43	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Carbon Dioxide Content	4.5	4.4	4.4	4.5	%
Oxygen Content	13.1	13.1	13.1	13.1	%
Carbon Monoxide Content	0.6	0.6	0.6	0.6	ppm
Nitrogen Content	82.4	82.5	82.5	82.4	%
Stack Dry Molecular Weight	29.25	29.23	29.23	29.24	lb/lb-mole
Stack Wet Molecular Weight	28.18	28.18	28.18	28.18	lb/lb-mole
Calculated Fuel Factor	1.724	1.767	1.762	1.751	
Fuel F-Factor	8642.84	8642.84	8642.84	8642.84	dscf/MMBtu
Percent Excess Air	151.2	150.7	152.0	151.3	%
Volumetric Flow Rate Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Average Stack Gas Velocity	62.43	62.43	61.82	62.23	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,417,111	1,417,306	1,403,465	1,412,627	acfm
Wet Standard Stack Flow Rate	66,972	66,484	66,083	66,513	wkscfh
Dry Standard Stack Flow Rate	60,591,269	60,244,109	59,881,504	60,238,961	dscfh
Percent of Isokinetic Rate	98.8	100.9	100.2	100.0	%
Ammonia Analysis (CTM-027)	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3B-R1-FH	U3B-R2-FH	U3B-R3-FH		
Lab Log Number (Back Half)	U3B-R1-BH	U3B-R2-BH	U3B-R3-BH		
Front Half Results (C_f)	4.4790	4.0660	4.5320	4.3590	mg/l
Back Half Results (C_b)	0.0520	0.0360	0.0880	0.0587	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	220	220	200	213	ml
Back Half Sample Volume	210	200	190	200	ml
Volume of NH_3	0.00131	0.00119	0.00121	0.00124	L
NH_3 Concentration	1.02	0.91	0.94	0.96	ppmvd
NH_3 Concentration	0.77	0.69	0.72	0.72	ppm@15%O_2

TEST RESULTS

NH_3 Emissions
Base Load with Duct Burners

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3B
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/19/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3B	
Base Run Number		Base wDB	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	03/20/11	03/20/11	03/20/11	
Load	% or w/DB	Base wDB	Base wDB	Base wDB	
Fuel F-Factor		8653.75	8653.75	8653.75	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	($\Delta H_@$)	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

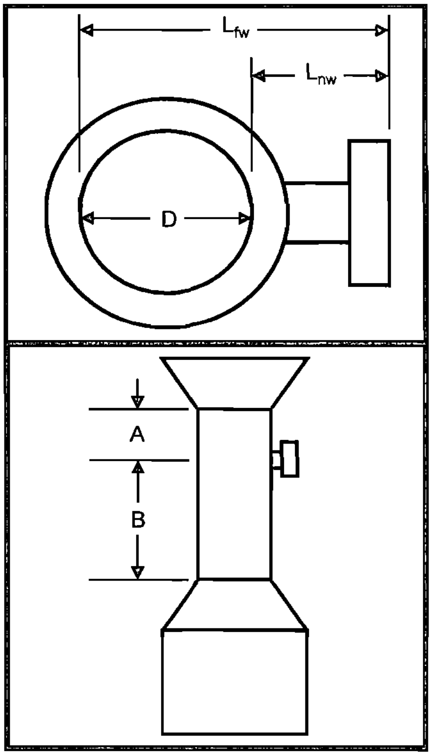
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/19/11
Sampling Location	Unit 3B	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²

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[1] 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

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

● Method 1 Tra ○ 12 Point PM Trav ○ Veloci

Location of Traverse Points in Circular Stacks									
Traverse	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center			
Sampling Location	Unit 3B			
Operator	TG			
Project #	bv-10-westcounty.fl-comp#2			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/19/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft^2
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	$(\%CO_2)$	4.93	%vd
Oxygen Concentration	$(\%O_2)$	12.20	%vd
Carbon Monoxide Concentration	(ppmCO)	1.24	ppmvd
Nitrogen Concentration	$(\%N_2)$	82.87	%vd
Stack Moisture Content	(B_{ws})	9.83	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.17	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	62.41	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	60,377,853	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	1,006,298	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,416,848	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	66,960,024	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):

If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number	Base wDB-V1			
Run Time	08:49	**Start**	09:23	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** $(v_{s(t)})$
	in H_2O	deg	°F	ft/sec
A-1	0.94	0	221	62.20
A-2	0.87	0	221	59.84
A-3	0.82	0	220	58.06
A-4	0.72	0	220	54.40
A-5	0.64	0	219	51.25
A-6	0.46	0	217	43.39
B-1	0.71	0	214	53.78
B-2	0.82	0	214	57.80
B-3	0.80	0	213	57.05
B-4	0.76	0	211	55.52
B-5	0.69	0	211	52.90
B-6	0.45	0	209	42.66
C-1	0.96	0	219	62.77
C-2	1.20	0	219	70.18
C-3	1.30	0	217	72.94
C-4	1.40	0	217	75.69
C-5	1.40	0	217	75.69
C-6	1.20	0	216	70.02
D-1	0.92	0	222	61.58
D-2	1.20	0	228	70.64
D-3	1.30	0	227	73.47
D-4	1.40	0	227	76.25
D-5	1.40	0	226	76.19
D-6	1.00	0	221	64.16
Average	0.97	0	219	
	0.97	**= Square roots of Δp**		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/20/11		
Sampling Location	Unit 3B	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data								
Run Number	Base wDB-1		**Run Start Time**		07:50	**Run Stop Time**	09:01	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	$(\%CO_2)$	$(\%O_2)$	(ppmCO)	$(\%N_2)$	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:11	4.9	12.2	1.2	82.9	29.27	1.773	126.2	YES

Gas Analysis Data								
Run Number	Base wDB-2		**Run Start Time**		09:09	**Run Stop Time**	10:17	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	$(\%CO_2)$	$(\%O_2)$	(ppmCO)	$(\%N_2)$	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:08	4.9	12.2	1.2	82.9	29.28	1.765	125.6	YES

Gas Analysis Data								
Run Number	Base wDB-3		**Run Start Time**		10:24	**Run Stop Time**	11:32	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	$(\%CO_2)$	$(\%O_2)$	(ppmCO)	$(\%N_2)$	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:08	5.0	12.2	1.4	82.8	29.28	1.758	126.1	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/20/11
Sampling Location	Unit 3B	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data									
Run Number		Base wDB-1		**Run Start Time**		07:50	**Run Stop Time**		09:01
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.270	dcf	**Barometric Pressure**		(P_b)	30.23	in Hg
Average Stack Temp		$(t_s)_{avg}$	227	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	87	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	2.00	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	833.30	752.90	621.50	896.50				
Initial Value	$(V_i),(W_i)$	758.90	731.80	615.20	884.70				
Net Value	$(V_n),(W_n)$	74.4	21.1	6.3	11.8				
Results									
Total Weight		(W_t)	113.60	g	**Water Vol Weighed**		$(V_{wsg(std)})$	5.356	scf
Std Meter Volume		$(V_{m(std)})$	45.900	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	10.45	%	**Final Moisture Content**		(B_{ws})	10.45	%

Moisture Content Data									
Run Number		Base wDB-2		**Run Start Time**		09:09	**Run Stop Time**		10:17
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.640	dcf	**Barometric Pressure**		(P_b)	30.25	in Hg
Average Stack Temp		$(t_s)_{avg}$	225	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	94	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.95	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	790.10	780.00	614.90	824.50				
Initial Value	$(V_i),(W_i)$	728.90	753.50	607.00	812.00				
Net Value	$(V_n),(W_n)$	61.2	26.5	7.9	12.5				
Results									
Total Weight		(W_t)	108.10	g	**Water Vol Weighed**		$(V_{wsg(std)})$	5.097	scf
Std Meter Volume		$(V_{m(std)})$	45.702	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	10.03	%	**Final Moisture Content**		(B_{ws})	10.03	%

Moisture Content Data									
Run Number		Base wDB-3		**Run Start Time**		10:24	**Run Stop Time**		11:32
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	47.200	dcf	**Barometric Pressure**		(P_b)	30.27	in Hg
Average Stack Temp		$(t_s)_{avg}$	220	°F	**Stack Static Pressure**		(P_{static})	0.79	in H_2O
Average Meter Temp		$(t_m)_{avg}$	92	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.92	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	805.80	760.00	621.80	907.40				
Initial Value	$(V_i),(W_i)$	750.50	737.60	615.00	896.50				
Net Value	$(V_n),(W_n)$	55.3	22.4	6.8	10.9				
Results									
Total Weight		(W_t)	95.40	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.498	scf
Std Meter Volume		$(V_{m(std)})$	45.512	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	8.99	%	**Final Moisture Content**		(B_{ws})	8.99	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Date	03/20/11
Operator	TG
Run Number	Base wDB-1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	227.0	°F
Average Meter Temp	(t_m)	87.1	
Orifice Meter Coefficient	(ΔH@)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.99	in H_2O
Stack Moisture Content	(B_{ws})	10.45	%
Stack Dry Molecular Weight	(M_d)	29.27	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.94	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	5.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	6.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2119	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg
Absolute Meter Pressure	(P_m)	30.36	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	07:50	**End**	09:01

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	758.9	731.8	615.2	884.7				
Post	833.3	752.9	621.5	896.5				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity ($(v_s)_i$)**	**Cumul. Meter Volume ($(V_m)_{std}$)**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume ($(V_m)_{std}$)**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	909.150	0.93	1.808	1.80	231	238	257	68			88	84	2.0	0.96	62.41	1.809	96.7	43.412
A-2	2.5	00:02:30	911.010	0.92	1.788	1.80	233	237	248	58			92	84	2.0	0.96	62.16	3.611	96.9	43.333
A-3	5.0	00:05:00	912.870	0.88	1.672	1.70	232	237	247	57			93	86	2.0	0.93	60.08	5.534	100.4	44.269
A-4	7.5	00:07:30	914.860	0.79	1.536	1.60	232	240	257	57			93	86	2.0	0.89	57.56	7.166	99.1	42.995
A-5	10.0	00:10:00	916.550	0.74	1.438	1.50	231	242	257	60			92	87	2.0	0.86	55.67	8.923	100.4	42.831
A-6	12.5	00:12:30	918.370	0.49	0.952	0.97	227	240	245	63			90	87	1.0	0.70	45.17	9.822	97.2	39.287
B-1	15.0	00:15:00	919.300	0.74	1.438	1.50	226	244	264	68			84	86	2.0	0.86	55.47	12.061	104.0	41.352
B-2	17.5	00:17:30	921.600	0.82	1.594	1.80	226	239	258	67			86	85	2.0	0.91	58.39	13.783	103.2	41.349
B-3	20.0	00:20:00	923.370	0.82	1.594	1.60	223	233	245	66			86	84	2.0	0.91	58.26	15.487	102.5	41.299
B-4	22.5	00:22:30	925.120	0.86	1.672	1.70	221	235	242	68			86	84	2.0	0.93	59.58	17.250	102.0	41.400
B-5	25.0	00:25:00	926.930	0.75	1.458	1.50	221	235	245	67			85	84	2.0	0.87	55.64	18.985	102.0	41.421
B-6	27.5	00:27:30	928.710	0.49	0.952	0.97	217	235	243	67			84	83	1.0	0.70	44.84	20.418	102.2	40.836
C-1	30.0	00:30:00	930.180	0.93	1.808	1.80	229	246	264	68			84	83	2.0	0.96	62.32	22.294	102.0	41.158
C-2	32.5	00:32:30	932.100	1.20	2.332	2.40	225	241	258	62			88	83	2.0	1.10	70.58	24.585	102.5	42.145
C-3	35.0	00:35:00	934.450	1.40	2.721	2.80	224	239	258	56			88	84	2.0	1.18	78.18	26.320	100.7	42.112
C-4	37.5	00:37:30	936.230	1.40	2.721	2.80	223	240	256	55			88	84	2.0	1.18	76.12	28.484	100.2	42.726
C-5	40.0	00:40:00	938.450	1.20	2.332	2.40	221	237	254	56			90	84	2.0	1.10	70.37	30.632	100.2	43.246
C-6	42.5	00:42:30	940.660	1.20	2.332	2.40	221	241	258	56			90	84	2.0	1.10	70.37	32.800	100.3	43.734
D-1	45.0	00:45:00	942.890	1.00	1.944	2.00	232	245	262	62			90	86	2.0	1.00	64.78	34.729	100.2	43.869
D-2	47.5	00:47:30	944.880	1.20	2.332	2.40	235	239	258	58			91	86	2.0	1.10	71.09	38.862	100.3	44.235
D-3	50.0	00:50:00	947.080	1.40	2.721	2.80	232	239	257	58			92	86	3.0	1.18	76.62	39.141	100.2	44.732
D-4	52.5	00:52:30	949.430	1.40	2.721	2.80	231	237	258	57			93	86	3.0	1.18	76.57	41.417	100.2	45.182
D-5	55.0	00:55:00	951.780	1.50	2.916	3.00	230	240	258	58			94	86	3.0	1.22	79.20	44.021	100.7	45.935
D-6	57.5	00:57:30	954.470	1.10	2.138	2.20	226	240	251	59			95	87	2.0	1.05	67.62	45.902	100.4	45.902
Last Pt	60.0	01:00:00	956.420																	
Final Val	60.0	01:00:00	956.420											Max Vac	3.0	Final Values		45.902	100.4	
Average Values				1.01		2.00	227	239	254	61			89	85		0.99	64.04			
													87							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Date	03/20/11
Operator	TG
Run Number	Base wDB-2

Filter #
1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	225.1	°F
Average Meter Temp	(t_m)	94.1	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.98	in H_2O
Stack Moisture Content	(B_{ws})	10.03	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.76	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.99	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	In H_2O for	15.0	sec
	Pre (-)	4.0	In H_2O for	15.0	soc
PASS	**Post (+)**	4.0	in H_2O for	15.0	sec
	Post (-)	6.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2135	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg
Absolute Meter Pressure	(P_m)	30.38	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	09:09	**End**	10:17

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	728.9	753.5	607.0	812.0				
Post	790.1	780.0	614.9	824.5				

Wash Volumes					
					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	In H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	956.720	0.99	1.969	2.00	233	238	255	68			92	89	2.0	0.99	64.40	1.893	97.9	45.424
A-2	2.5	00:02:30	958.680	1.20	2.387	2.40	235	240	257	67			95	89	2.0	1.10	71.01	3.984	98.1	47.814
A-3	5.0	00:05:00	960.850	1.40	2.785	2.80	232	239	255	65			96	89	3.0	1.18	76.53	6.308	99.2	50.462
A-4	7.5	00:07:30	963.260	1.40	2.785	2.80	232	234	256	64			98	90	3.0	1.18	76.53	8.644	99.8	51.864
A-5	10.0	00:10:00	965.690	1.50	2.984	3.00	230	237	260	63			96	91	3.0	1.22	79.10	10.887	98.6	52.258
A-6	12.5	00:12:30	968.020	1.00	1.989	2.00	225	234	258	65			96	90	2.0	1.00	64.35	12.925	99.5	51.700
B-1	15.0	00:15:00	970.140	0.90	1.790	1.80	222	245	261	68			95	90	2.0	0.95	60.91	14.772	99.5	50.645
B-2	17.5	00:17:30	972.060	1.20	2.387	2.40	226	254	258	63			98	90	2.0	1.10	70.54	16.798	98.9	50.394
B-3	20.0	00:20:00	974.170	1.40	2.785	2.80	224	255	263	64			99	92	3.0	1.18	76.08	19.051	98.7	50.804
B-4	22.5	00:22:30	976.520	1.40	2.785	2.80	223	257	261	64			98	91	3.0	1.18	76.03	21.347	98.7	51.233
B-5	25.0	00:25:00	978.910	1.40	2.785	2.80	222	250	273	66			99	92	3.0	1.18	75.97	23.648	98.8	51.596
B-6	27.5	00:27:30	981.310	1.00	1.989	2.00	219	257	257	67			98	92	2.0	1.00	64.07	25.640	99.0	51.281
C-1	30.0	00:30:00	983.390	0.70	1.392	1.40	223	253	265	68			96	92	1.0	0.84	53.76	27.403	99.6	50.591
C-2	32.5	00:32:30	985.230	0.71	1.412	1.40	224	254	258	65			98	92	1.0	0.84	54.18	29.029	99.5	49.765
C-3	35.0	00:35:00	986.930	0.78	1.551	1.50	221	253	252	61			99	93	2.0	0.88	56.67	30.739	99.5	49.182
C-4	37.5	00:37:30	988.720	0.78	1.551	1.50	220	254	260	58			98	93	2.0	0.88	56.63	32.517	99.6	48.775
C-5	40.0	00:40:00	990.580	0.79	1.571	1.60	219	252	258	57			98	93	2.0	0.89	56.94	34.257	99.6	48.362
C-6	42.5	00:42:30	992.400	0.50	0.995	1.00	215	251	257	55			98	93	1.0	0.71	45.17	35.717	99.8	47.623
D-1	45.0	00:45:00	993.930	0.75	1.492	1.50	223	255	258	68			94	93	2.0	0.87	55.65	37.367	99.7	47.200
D-2	47.5	00:47:30	995.650	0.86	1.711	1.70	231	259	251	65			96	93	2.0	0.93	59.94	39.158	99.7	46.990
D-3	50.0	00:50:00	997.520	0.82	1.631	1.60	228	258	257	63			96	92	2.0	0.91	58.40	40.932	99.7	46.779
D-4	52.5	00:52:30	999.370	0.81	1.611	1.60	227	254	251	64			96	93	2.0	0.90	58.00	42.685	99.7	46.565
D-5	55.0	00:55:00	1001.200	0.67	1.333	1.30	226	251	258	65			95	92	2.0	0.82	52.71	44.324	99.8	46.251
D-6	57.5	00:57:30	1002.910	0.49	0.975	0.98	223	257	246	66			95	92	1.0	0.70	44.98	45.713	99.9	45.713
Last Pt	60.0	01:00:00	1004.360																	
Final Val	60.0	01:00:00	1004.360											**Mex Vac**	3.0	**Final Values**		45.713	99.9	
Average Values				0.98		1.95	225	250	258	64			97	92		0.98	62.86			
													94							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Date	03/20/11
Operator	TG
Run Number	Base wDB-3

Filter #
1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	219.6	°F
Average Meter Temp	(t_m)	91.6	
Orifice Meter Coefficient	(ΔH@)	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}_{avg})$	0.97	in H_2O
Stack Moisture Content	(B_{ws})	8.99	%
Stack Dry Molecular Weight	(M_d)	29.28	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.76	acfm
ΔP to ΔH Isokinetic Factor	(K)	2.03	

Leak Checks					
Train	**Pre**	0.000	ft^3/min@	15.0	in Hg
PASS	**Post**	0.000	ft^3/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
	Pre (-)	4.0	in H_2O for	15.0	sec
PASS	**Post (+)**	4.0	in H_2O for	15.0	sec
	Post (-)	6.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_n)	0.2139	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Pressures			
Barometric Pressure	(P_b)	30.27	in Hg
Stack Static Pressure	(P_{static})	0.79	in H_2O
Absolute Stack Pressure	(P_s)	30.33	in Hg
Absolute Meter Pressure	(P_m)	30.40	in Hg

Run Time			
Start	10:24	**End**	11:32

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	750.5	737.6	615.0	896.5				
Post	805.8	760.0	621.8	907.4				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft^3	In H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	4.650	0.76	1.546	1.50	229	254	249	68			92	92	2.0	0.87	56.13	1.684	98.2	40.425
A-2	2.5	00:02:30	6.400	0.84	1.709	1.70	228	256	244	63			93	91	2.0	0.92	58.96	3.456	98.1	41.475
A-3	5.0	00:05:00	8.240	0.78	1.587	1.60	226	258	249	60			93	90	2.0	0.88	56.74	5.229	99.4	41.834
A-4	7.5	00:07:30	10.080	0.76	1.546	1.50	225	258	257	61			93	90	2.0	0.87	55.96	6.934	99.3	41.606
A-5	10.0	00:10:00	11.850	0.63	1.282	1.30	225	251	252	61			94	90	1.0	0.79	50.95	8.493	99.3	40.766
A-6	12.5	00:12:30	13.470	0.39	0.793	0.78	219	253	249	61			92	90	1.0	0.62	39.91	9.763	99.8	39.054
B-1	15.0	00:15:00	14.790	0.70	1.424	1.40	221	258	260	64			93	90	2.0	0.84	53.55	11.420	99.8	39.155
B-2	17.5	00:17:30	16.510	0.78	1.587	1.60	221	259	257	61			94	90	2.0	0.88	58.53	13.105	99.3	39.315
B-3	20.0	00:20:00	18.260	0.81	1.648	1.60	217	251	255	58			94	90	2.0	0.90	57.44	14.847	99.1	39.593
B-4	22.5	00:22:30	20.070	0.76	1.546	1.50	215	254	257	56			95	90	2.0	0.87	55.55	16.521	98.9	39.649
B-5	25.0	00:25:00	21.810	0.74	1.505	1.50	214	254	251	55			94	90	2.0	0.86	54.78	18.224	98.9	39.762
B-6	27.5	00:27:30	23.580	0.56	1.139	1.10	211	253	254	55			94	90	1.0	0.75	47.54	19.753	99.2	39.506
C-1	30.0	00:30:00	25.170	0.84	1.709	1.70	215	254	245	68			93	90	2.0	0.92	58.40	21.536	99.1	39.759
C-2	32.5	00:32:30	27.020	1.10	2.238	2.20	219	256	246	67			95	90	2.0	1.05	67.03	23.501	98.7	40.288
C-3	35.0	00:35:00	29.060	1.30	2.645	2.60	216	257	239	65			95	92	3.0	1.14	72.71	25.686	98.5	41.098
C-4	37.5	00:37:30	31.330	1.50	3.051	3.00	215	246	246	64			96	91	3.0	1.22	78.06	28.075	98.5	42.113
C-5	40.0	00:40:00	33.810	1.50	3.051	3.00	213	257	257	65			95	90	3.0	1.22	77.93	30.498	98.5	43.055
C-6	42.5	00:42:30	36.320	1.20	2.441	2.40	212	259	259	65			93	90	3.0	1.10	69.65	32.680	98.6	43.573
D-1	45.0	00:45:00	38.580	0.97	1.973	2.00	216	256	258	68			92	90	2.0	0.98	62.81	34.697	98.9	43.828
D-2	47.5	00:47:30	40.670	1.10	2.238	2.20	226	259	243	64			92	90	2.0	1.05	67.38	36.726	98.8	44.071
D-3	50.0	00:50:00	42.770	1.20	2.441	2.40	223	253	249	61			91	90	2.0	1.10	70.22	38.766	98.6	44.305
D-4	52.5	00:52:30	44.880	1.30	2.645	2.80	223	255	252	59			90	89	3.0	1.14	73.08	40.986	98.6	44.713
D-5	55.0	00:55:00	47.170	1.30	2.645	2.60	222	256	254	59			90	88	3.0	1.14	73.03	43.150	98.5	45.026
D-6	57.5	00:57:30	49.400	1.10	2.238	2.20	218	254	261	60			91	88	2.0	1.05	66.98	45.523	99.3	45.523
Last Pt	60.0	01:00:00	51.850																	
Final Val	60.0	01:00:00	51.850											**Max Vac**	3.0	**Final Values**		45.523	99.3	
Average Values				0.98		1.92	220	255	252	62			93	90		0.97	61.72			
													92							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/20/11
Sampling Location	Unit 3B	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data				
Run Number	Base wDB-1	Base wDB-2	Base wDB-3	
Run Start Time	07:50	09:09	10:24	(hh:mm)
Run Stop Time	09:01	10:17	11:32	(hh:mm)
Train Prepared By	AS	AS	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/20/11	03/20/11	03/20/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/20/11	03/20/11	03/20/11	(mm/dd/yy)
Relinquished Time	09:01	10:17	11:32	(hh:mm)

Equipment Identification Numbers			
Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Weight					
Final Weight	(W_f)	2207.7	2185.0	2187.6	g
Initial Weight	(W_i)	2105.9	2089.4	2103.1	g
Net Weight	(W_n)	101.8	95.6	84.5	g
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W_f)	896.5	824.5	907.4	g
Initial Weight	(W_i)	884.7	812.0	896.5	g
Net Weight	(W_n)	11.8	12.5	10.9	g
Comments					
Total Water Collected					
Total Weight	(W_{lc})	113.6	108.1	95.4	g
Total Volume	(V_{lc})	113.8	108.3	95.6	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Run Start Time	07:50	09:09	10:24		hh:mm
Run Stop Time	09:01	10:17	11:32		hh:mm
Test Date	03/20/11	03/20/11	03/20/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Initial Meter Volume	909.150	956.720	4.650		ft^3
Final Meter Volume	956.420	1004.360	51.850		ft^3
Total Meter Volume	47.270	47.640	47.200	47.370	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	87.10	94.06	91.56	90.91	°F
Average Stack Temperature	227.04	225.13	219.55	223.91	°F
Barometric Pressure	30.23	30.25	30.27	30.25	in Hg
Stack Static Pressure	0.79	0.79	0.79	0.79	in H_2O
Absolute Stack Pressure	30.29	30.31	30.33	30.31	in Hg
Average Orifice Pressure Drop	2.00	1.95	1.92	1.95	in H_2O
Absolute Meter Pressure	30.36	30.38	30.40	30.38	in Hg
Avg Square Root Pitot Pressure	0.99	0.98	0.97	0.98	$\sqrt{(\text{in } H_2O)}$
Moisture Content Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Impinger Water Weight Gain	101.80	95.60	84.50	93.97	g
Silica Gel Weight Gain	11.80	12.50	10.90	11.73	g
Total Water Volume Collected	113.80	108.29	95.57	105.89	ml
Standard Water Vapor Volume	5.36	5.10	4.50	4.98	scf
Standard Meter Volume	45.9	45.7	45.5	45.7	dscf
Calculated Stack Moisture	10.45	10.03	8.99	9.83	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	10.45	10.03	8.99	9.83	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3B
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Carbon Dioxide Content	4.9	4.9	5.0	4.9	%
Oxygen Content	12.2	12.2	12.2	12.2	%
Carbon Monoxide Content	1.2	1.2	1.4	1.2	ppm
Nitrogen Content	82.9	82.9	82.8	82.9	%
Stack Dry Molecular Weight	29.27	29.28	29.28	29.28	lb/lb-mole
Stack Wet Molecular Weight	28.09	28.15	28.27	28.17	lb/lb-mole
Calculated Fuel Factor	1.773	1.765	1.758	1.765	
Fuel F-Factor	8653.75	8653.75	8653.75	8653.75	dscf/MMBtu
Percent Excess Air	126.2	125.6	126.1	126.0	%
Volumetric Flow Rate Data	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Average Stack Gas Velocity	64.04	62.86	61.72	62.87	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,453,803	1,426,900	1,401,138	1,427,280	acfm
Wet Standard Stack Flow Rate	67,861	66,835	66,210	66,969	wkscfh
Dry Standard Stack Flow Rate	60,769,205	60,129,315	60,255,152	60,384,557	dscfh
Percent of Isokinetic Rate	100.4	99.9	99.3	99.8	%
Ammonia Analysis (CTM-027)	**Base wDB-1**	**Base wDB-2**	**Base wDB-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3B-R1DB-FH	U3B-R2DB-FH	U3B-R3DB-FH		
Lab Log Number (Back Half)	U3B-R1DB -BH	U3B-R2DB-BH	U3B-R3DB-BH		
Front Half Results (C_f)	5.1900	4.2590	3.4600	4.3030	mg/l
Back Half Results (C_b)	0.0730	0.0380	0.0600	0.0570	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	200	200	200	200	ml
Back Half Sample Volume	180	180	180	180	ml
Volume of NH_3	0.00138	0.00113	0.00092	0.00115	L
NH_3 Concentration	1.06	0.87	0.72	0.88	ppmvd
NH_3 Concentration	0.72	0.59	0.49	0.60	ppm@15%O_2

TEST RESULTS

Opacity
Base Load

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3B Base
Location: West County Energy Center
Date: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3B Base
Location: West County Energy Center
Date: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3B Base
Location: West County Energy Center
Date: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

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

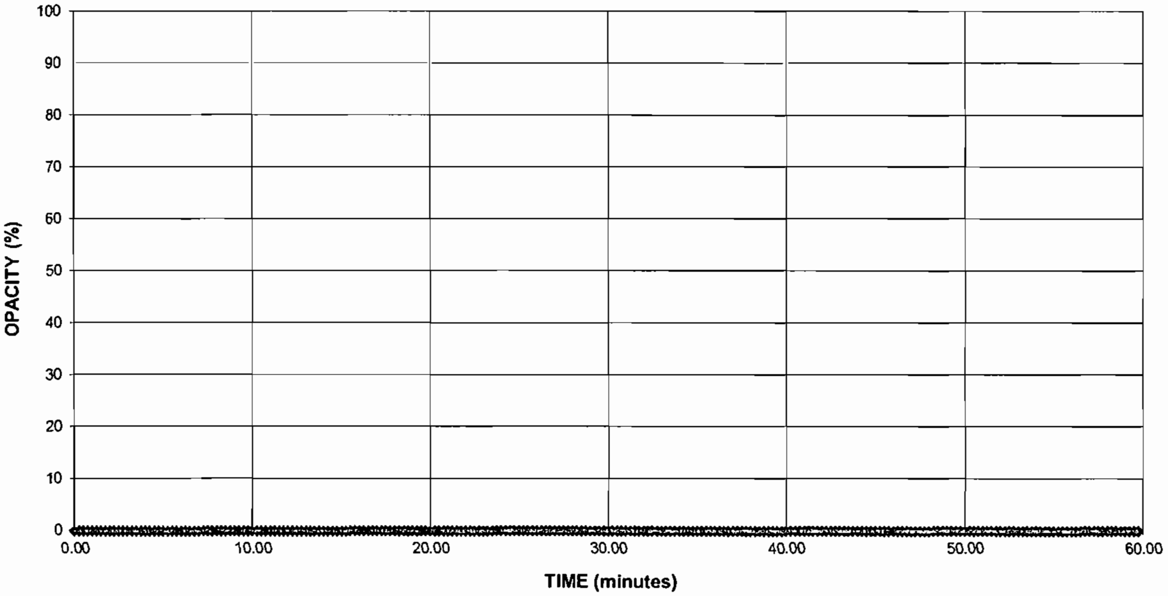
TIME (min)	OPACITY (%)	6 MIN AVG.
0.00	0	N/A
0.25	0	N/A
0.50	0	N/A
0.75	0	N/A
1.00	0	N/A
1.25	0	N/A
1.50	0	N/A
1.75	0	N/A
2.00	0	N/A
2.25	0	N/A
2.50	0	N/A
2.75	0	N/A
3.00	0	N/A
3.25	0	N/A
3.50	0	N/A
3.75	0	N/A
4.00	0	N/A
4.25	0	N/A
4.50	0	N/A
4.75	0	N/A
5.00	0	N/A
5.25	0	N/A
5.50	0	N/A
5.75	0	0.00
6.00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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3B Base
Location: West County Energy Center
Date: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

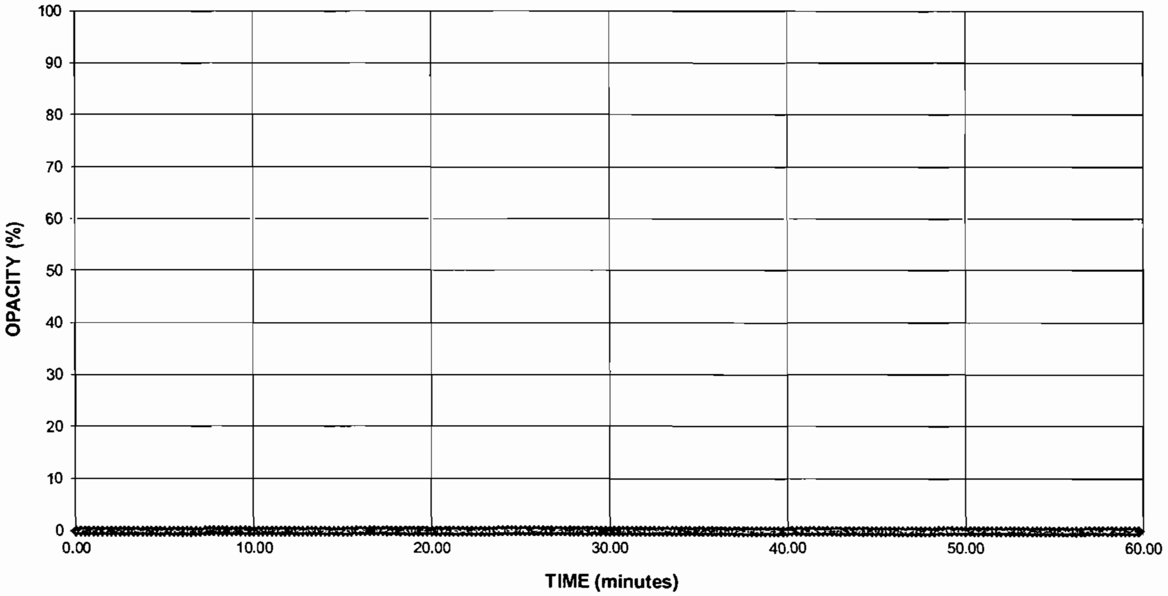
Run 1

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)

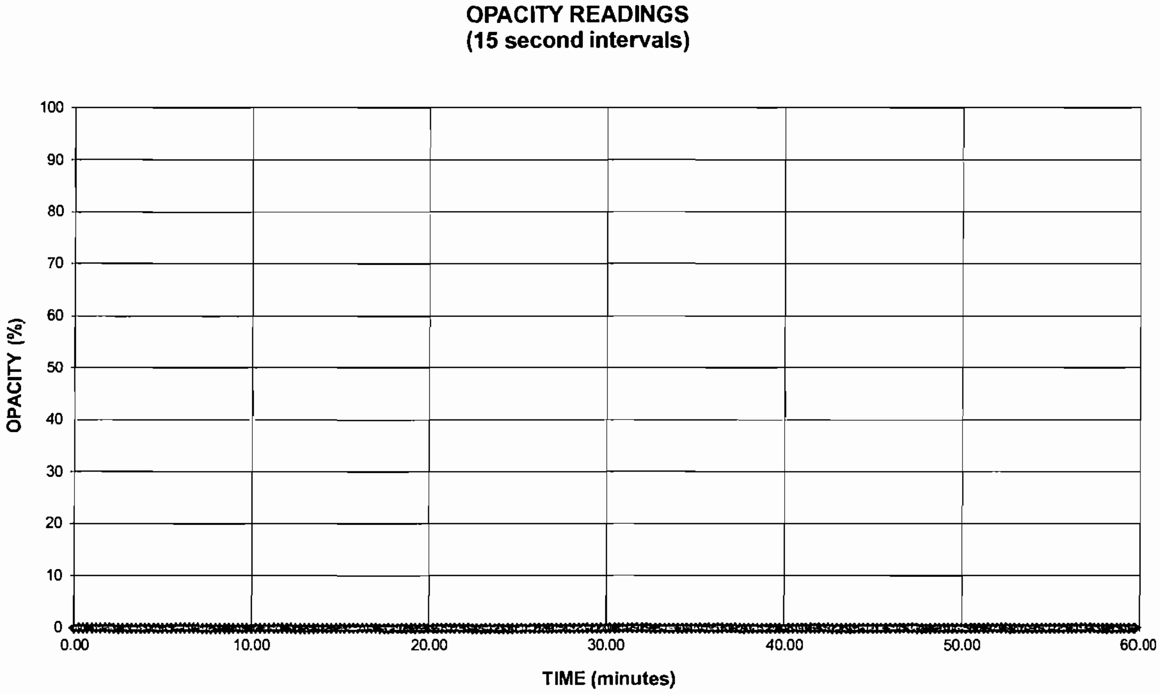


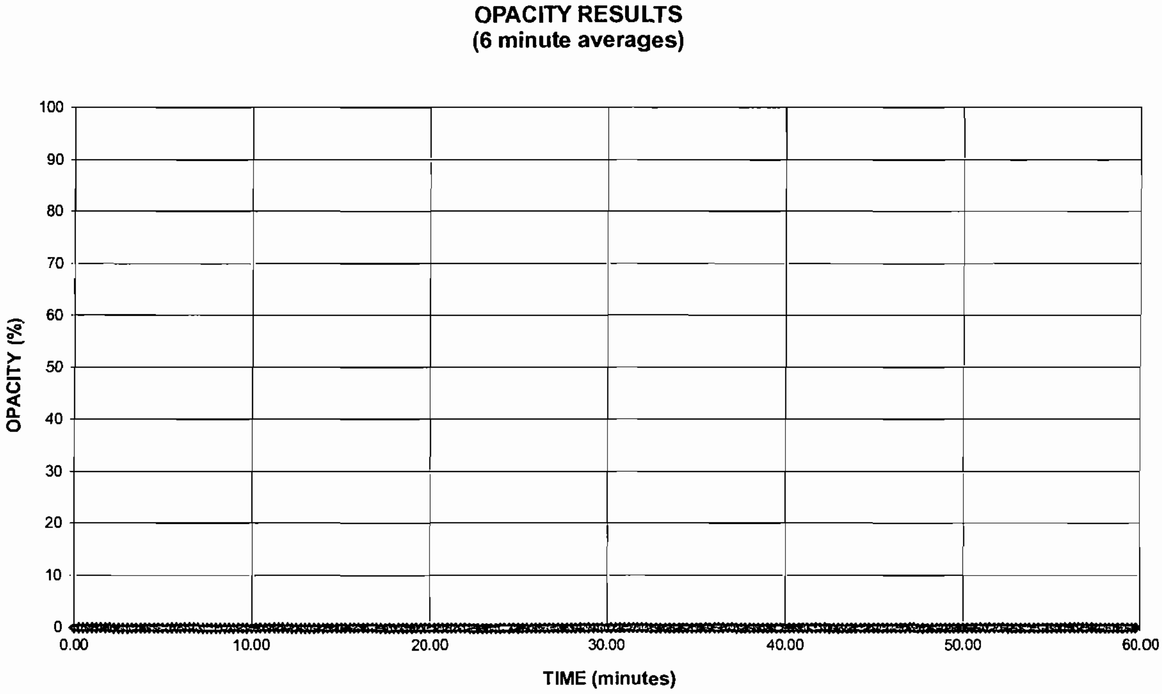
OPACITY RESULTS
(6 minute averages)



Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit U3B Base
Location:	West County Energy Center
Date:	March 19, 2011
Project #:	bv-10-westcounty.fl-comp#2

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

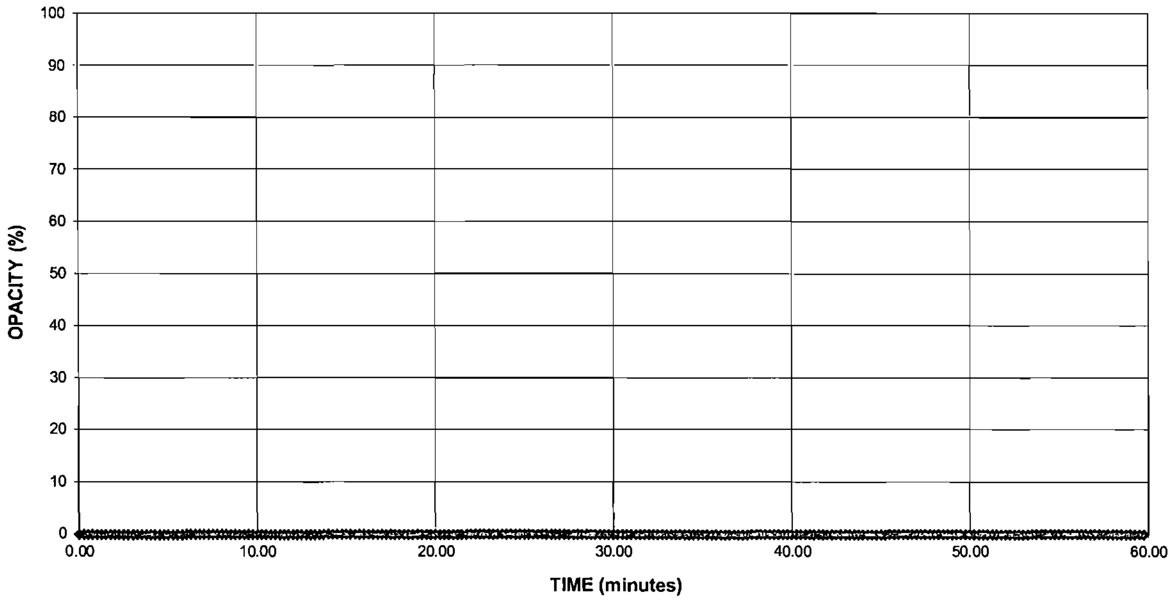




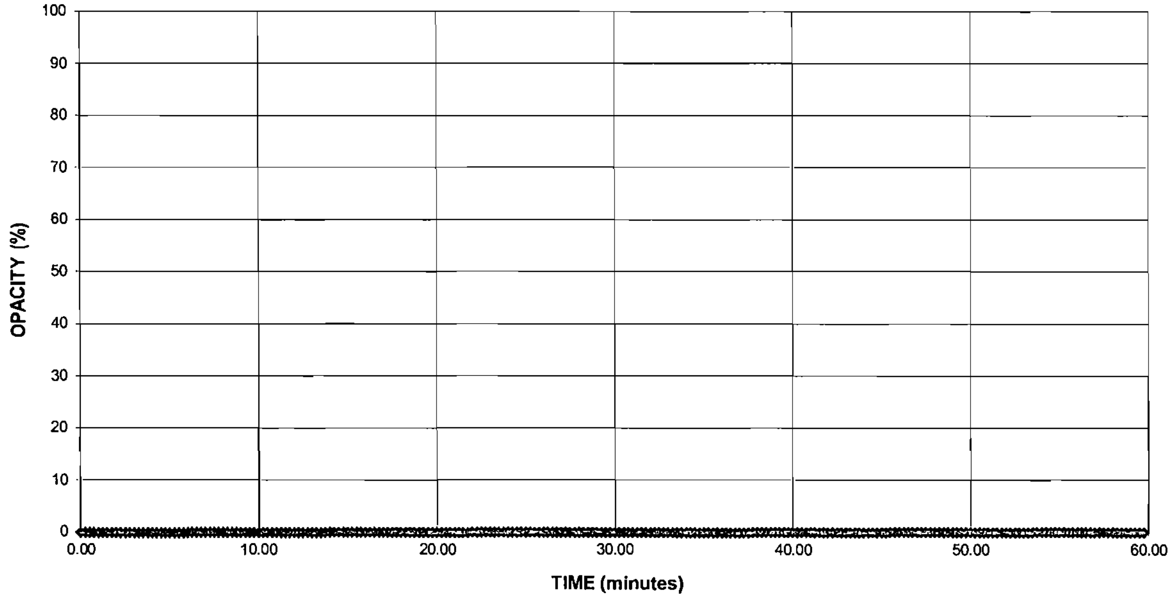
Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3B Base
Location: West County Energy Center
Date: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

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)



VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

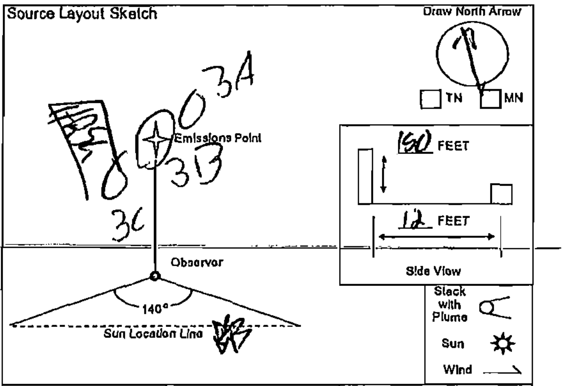
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 4° End 4°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 500 ft @184° End 500 ft @184°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start calm End calm
Wind Direction Start N/A End N/A
Ambient Temp Start 74° End 72°
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

Form Number bv-10-westcounty-fl-3B-1 Page 1 of 6
Continued on Form Number bv-10-westcounty-fl-3B
Observation Date 19Mar11 Time Zone Eastern Start Time 1045 End Time 1144

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 19Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

VISUAL EMISSIONS OBSERVATION FORM

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Base W/O DA
Control Equipment HRSG Operating Mode Base

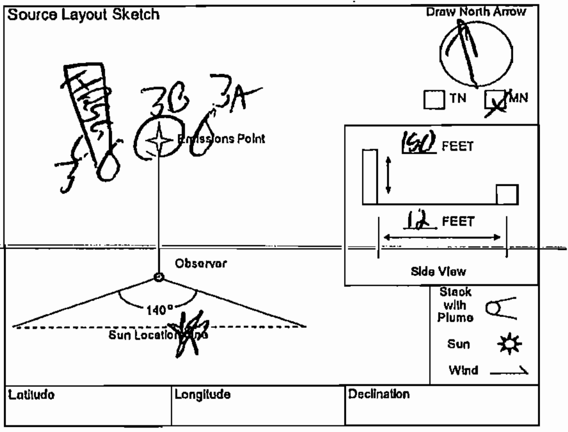
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 4° End 4°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 184° End 500 ft @ 184°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start calm End calm
Wind Direction Start N/A End NA
Ambient Temp. Start 74 End 78
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

Form Number bv-10-westcounty-f1-3B-2 Page 2 of 6
Continued on Form Number bv-10-westcounty-f1-3B-1
Observation Date 19 Mar 11 Time Zone Eastern Start Time 1045 End Time 1144

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 19 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Bcy up D13
Control Equipment HRSG Operating Mode Base

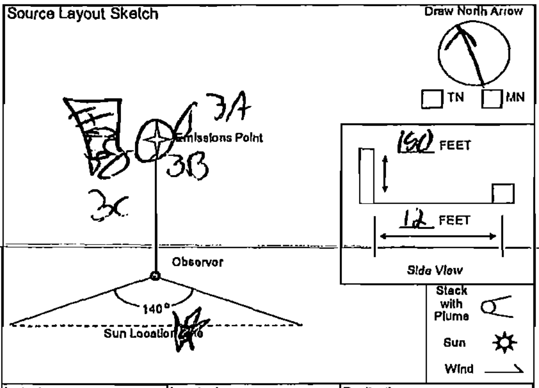
Describe Emissions Point
combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 600 ft End 600 ft
Direction to Emiss. Pt. (Degrees) Start 40 End 40

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 600 ft @ 184° End 600 ft 184°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start calm End calm
Wind Direction Start NA End NA
Ambient Temp. Start 78 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3B-3 Page 3 of 6
Continued on Form Number bv-10-westcounty-f1-3B-2
Observation Date 6Mar11
Time Zone Eastern
Start Time 1146
End Time 1245

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 6Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

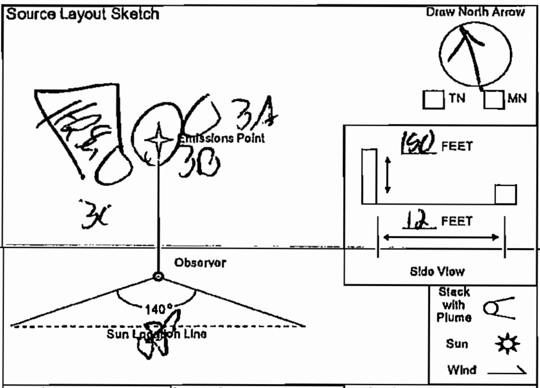
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 4° End 4°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 184° End 500 ft @ 184°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start calm End calm
Wind Direction Start N/A End N/A
Ambient Temp. Start 78 End 80
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3B-4 Page 4 of 6
Continued on Form Number bv-10-westcounty-f1-3B-3
Observation Date 19Mar11 Time Zone Eastern Start Time 1146 End Time 1245

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 19Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

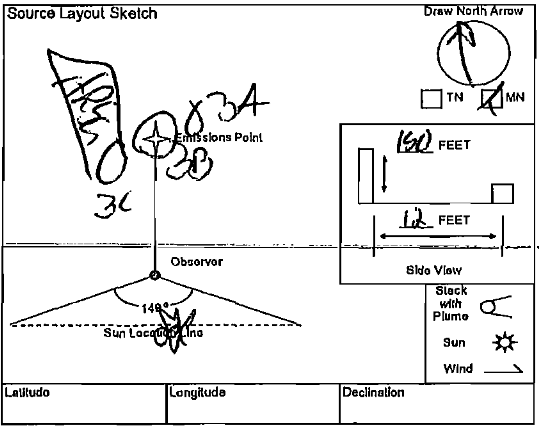
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start 4° End 4°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 184° End 500 ft @ 184°

Describe Emissions Start NV End NV
Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue Sky Conditions Start clear End clear
Wind Speed Start calm End calm Wind Direction Start NA End NA
Ambient Temp. Start 81 End 82 Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3B-5 Page 5 of 6
Continued on Form Number bv-10-westcounty-fl-3B-4
Observation Date 19Mar11 Time Zone Eastern Start Time 1250 End Time 1349

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 19Mar-11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3B Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

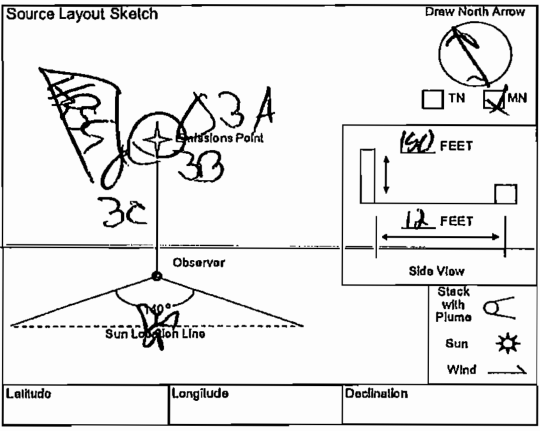
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 40 End 40

Vertical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 184° End 184°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 181° End 500 ft @ 81°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start calm End calm
Wind Direction Start NA End NA
Ambient Temp. Start 81 End 82
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3B-6 Page 6 of 6
Continued on Form Number bv-10-westcounty-fl-3B-5
Observation Date 19Mar
Time Zone Eastern
Start Time 1250
End Time 1344

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Rob White Date 19Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

TEST RESULTS

Opacity
Base Load with Duct Burners

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3B Base wDB
Location: West County Energy Center
Date: March 20, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3B Base wDB
Location: West County Energy Center
Date: March 20, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3B Base wDB
Location: West County Energy Center
Date: March 20, 2011
Project #: bv-10-westcounty.fl-comp#2

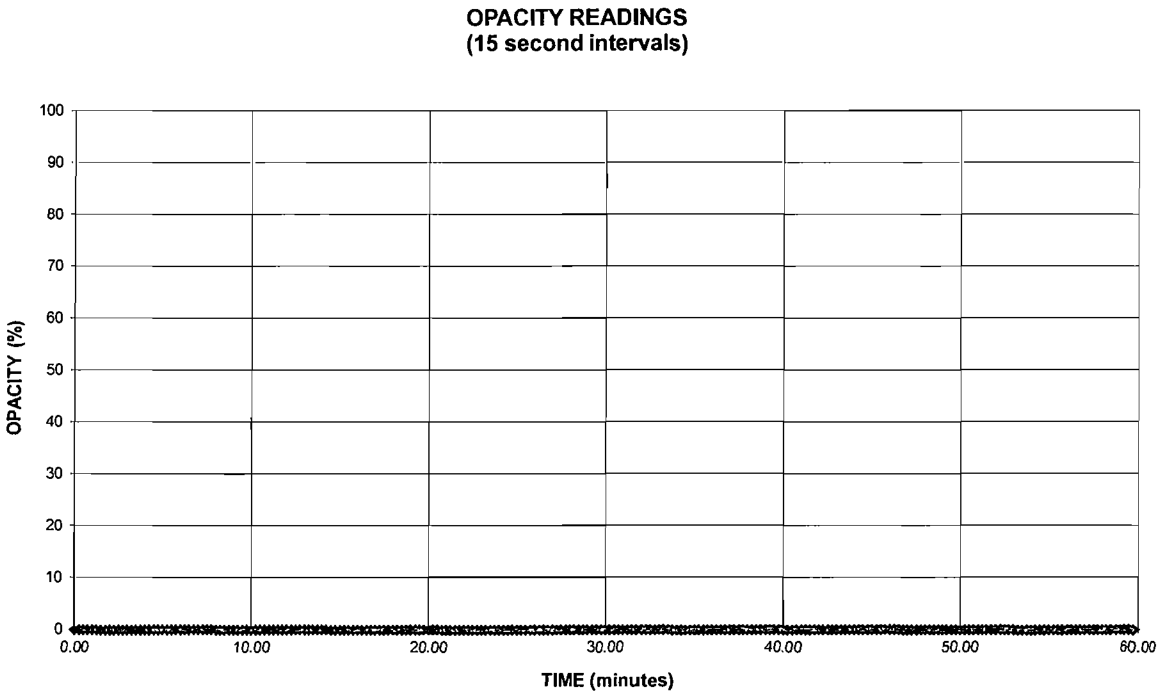
Run 3

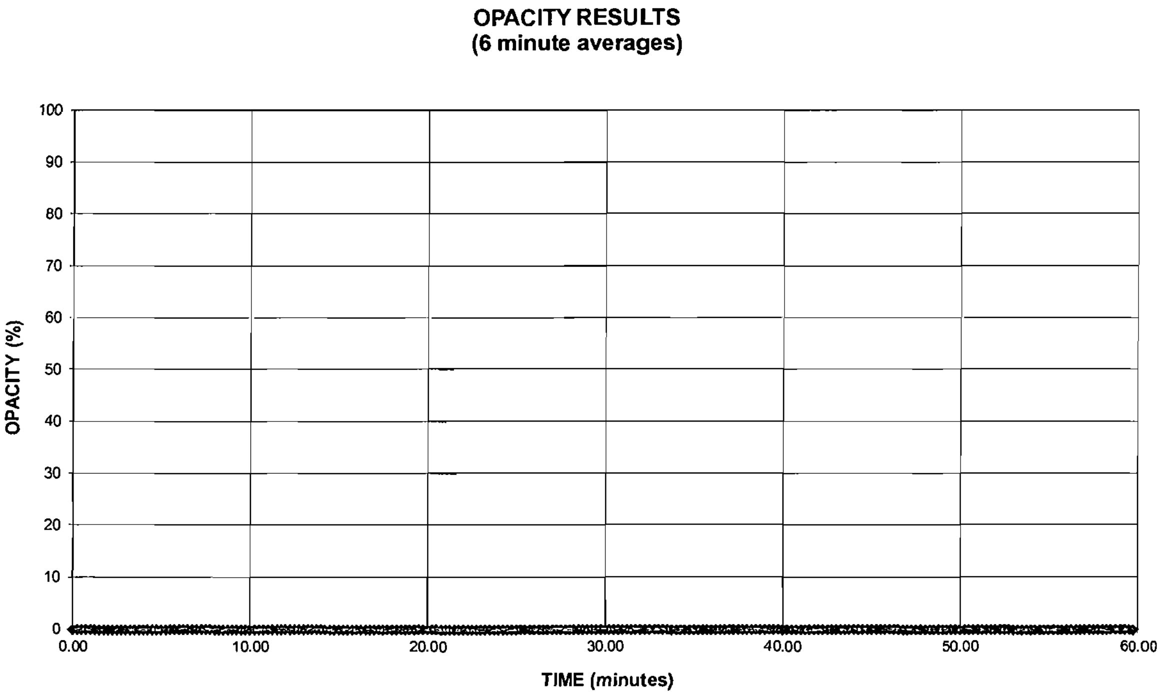
Average Opacity: 0.00 %
Maximum Opacity: 0 %
6 Minute Average: 0.00 %
6 Minute Maximum: 0.00 %
Max Time w/ Opacity: 0.00 minutes

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 3B Base wDB
Location:	West County Energy Center
Date:	March 20, 2011
Project #:	*bv-10-westcounty.fl-comp#2*

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*

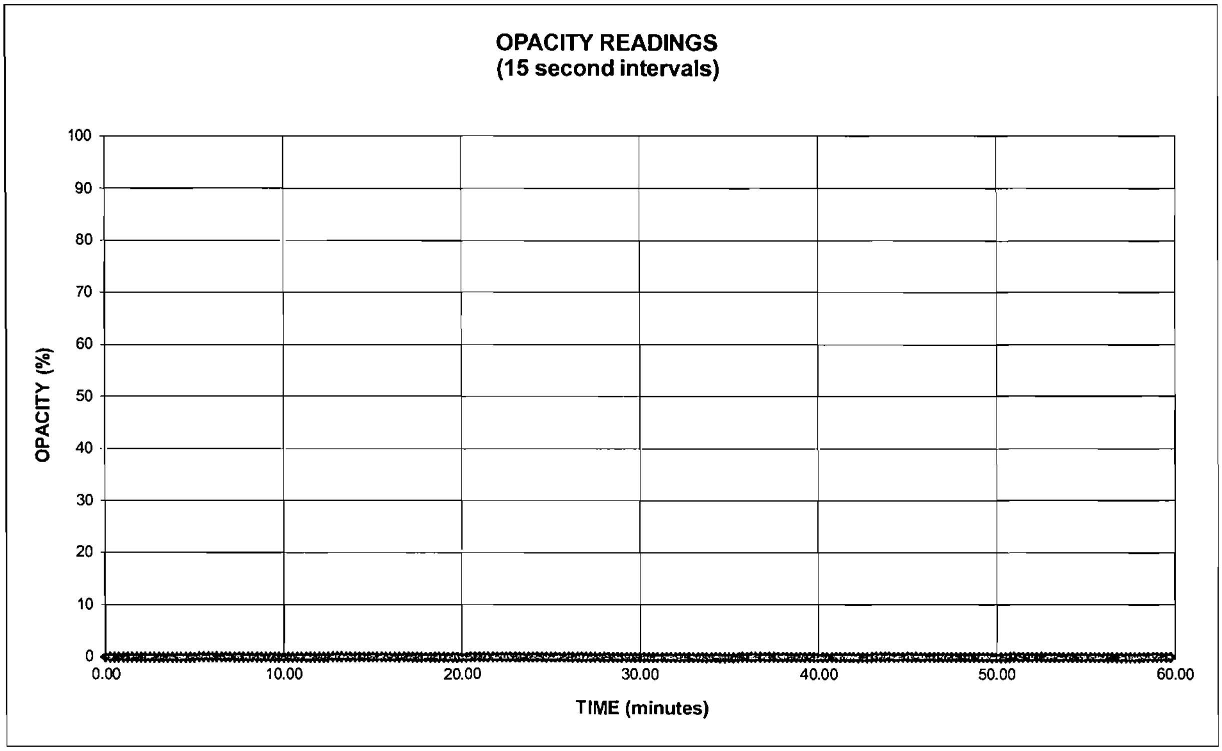


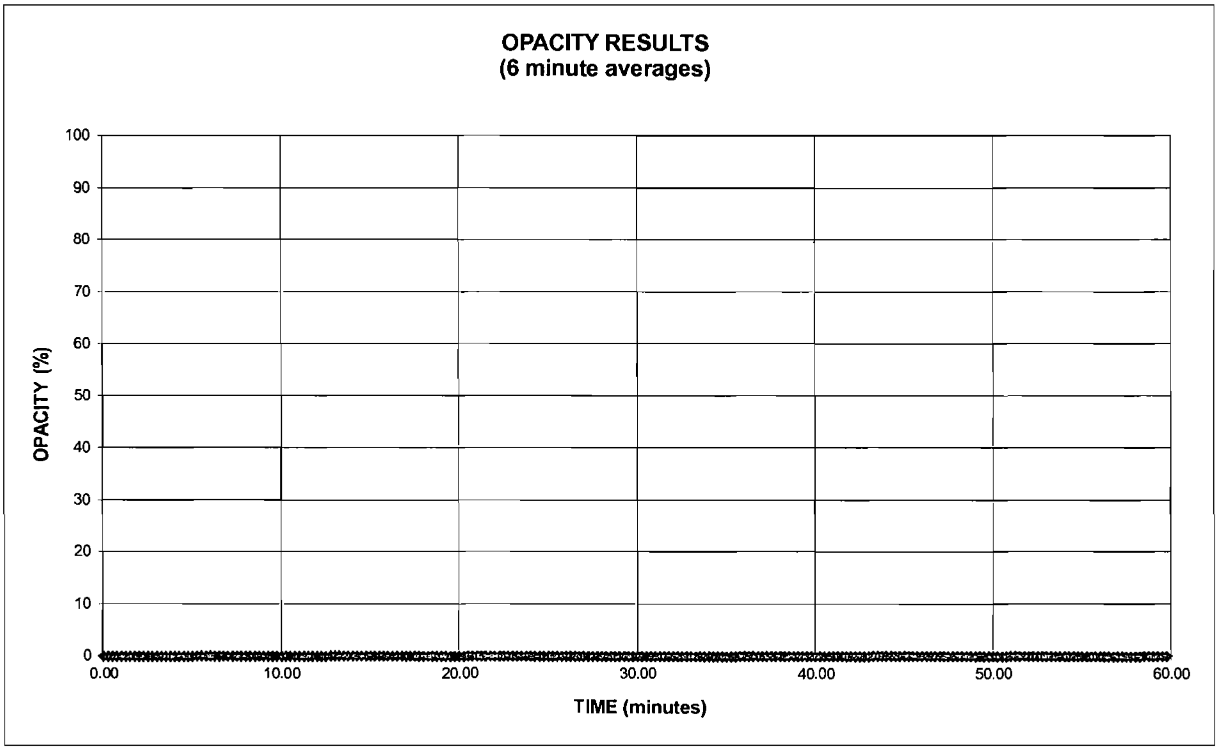


Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3B Base wDB
Location: West County Energy Center
Date: March 20, 2011
Project #: bv-10-westcounty.fl-comp#2

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

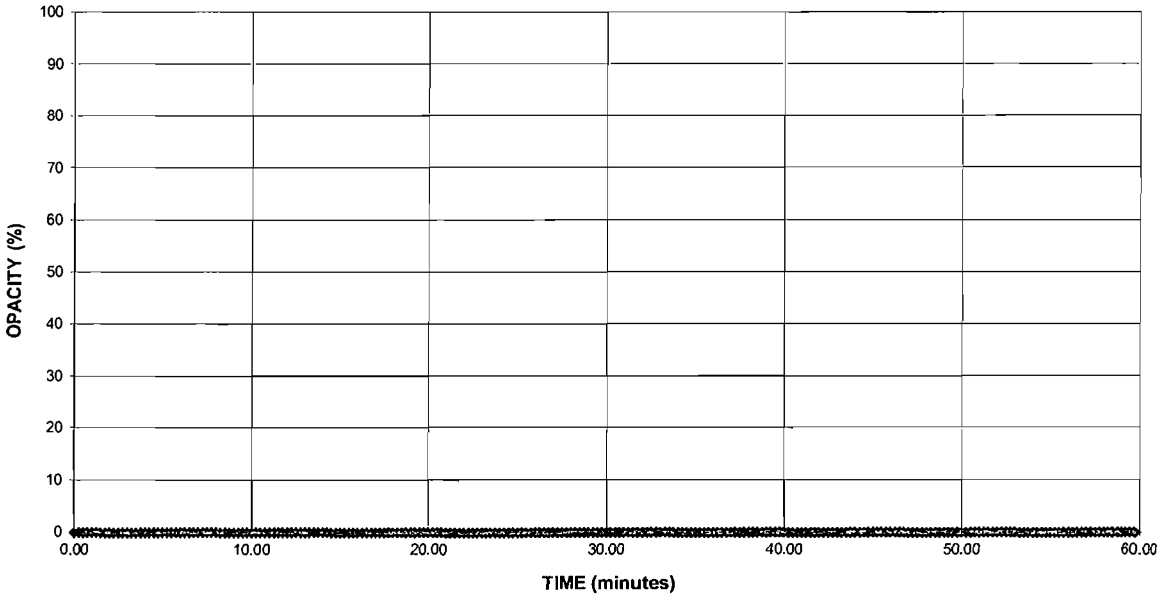

OPACITY READINGS
(15 second intervals)


OPACITY RESULTS
(6 minute averages)

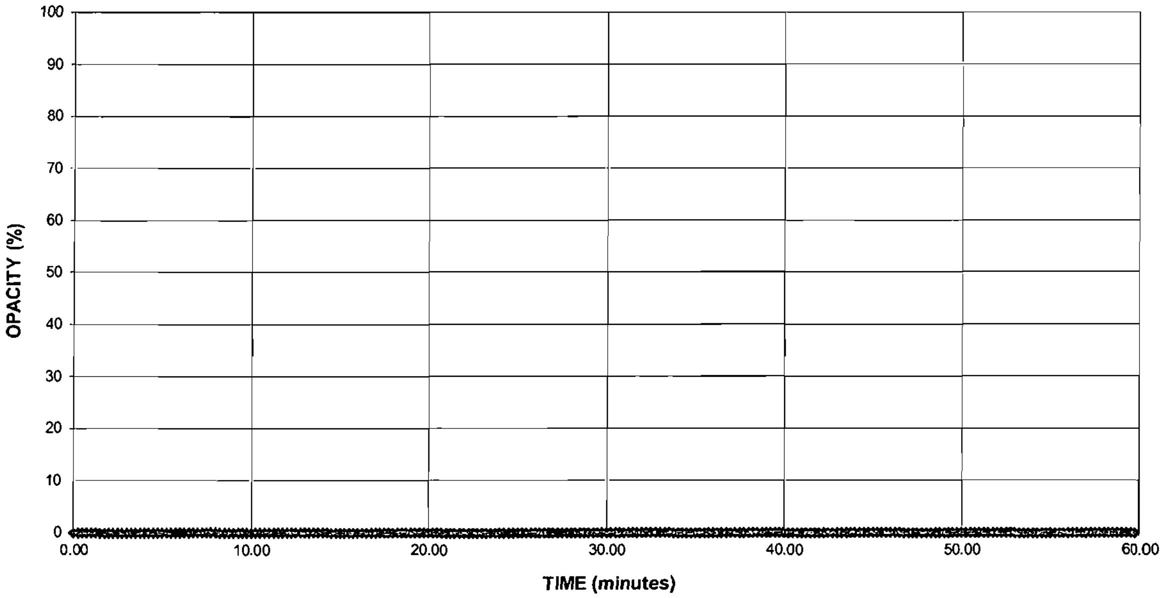
Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3B Base wDB
Location: West County Energy Center
Date: March 20, 2011
Project #: *bv-10-westcounty.fl-comp#2*

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

Form Number
Page 1 of 6

Continued on Form Number 60-10-WESTCOUNTY.FL-3B-DB-1

Observation Date 20 MARCH 2011	Time Zone EST	Start Time 9:00 AM	End Time 10:00 AM

Company Name FPL
Facility Name WEST COUNTY ENERGY
Street Address 20505 ST RD 80
City LOXAHATCHEE State FL Zip 33470

Process NG Unit # 3B Operating Mode BASE W/DB
Control Equipment HRSG Operating Mode BASE

Describe Emissions Point CENTER STACK - GREY COLOR

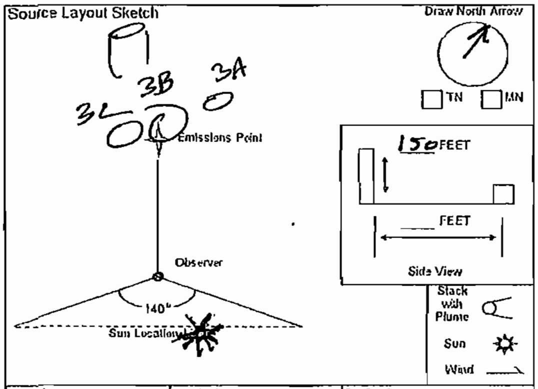
Height of Emiss. Pt. Start 150 FT End 150 FT
Height of Emiss. Pt. Rel. to Observer Start 150 FT End 150 FT
Distance to Emiss. Pt. Start 500 FT End 500 ft
Direction to Emiss. Pt. (Degrees) Start 325 NW End 325 NW

Vetical Angle to Obs. Pt. Start 2° End 2°
Direction to Obs. Pt. (Degrees) Start ~~180~~ 325NW End ~~180~~ 325NW
Distance and Direction to Observation Point from Emission Point
Start 500 FT @ ~~180~~ 325 NW End 500 FT @ ~~180~~ 325 NW

Describe Emissions
Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background
Start SKY End SKY
Background Color Start BLUE End BLUE
Sky Conditions Start PARTLY CLOUDY End PARTLY CLOUDY
Wind Speed Start 2-4 MPH End 2-4
Wind Direction Start NW End NW
Ambient Temp. Start 61°F End 70°F
Wet Bulb Temp.
RH Percent 83%

Source Layout Sketch



Latitude 26°41'31.75"N
Longitude 80°22'24.68"W
Declination

Additional Information

Min. \ Sec.	0	15	30	45	Comments
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) GIRIDHAR JAYARAMAN
Observer's Signature
Date 3/20/11
Organization AHI
Certified By ETA
Date

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name: FPL
Facility Name: WESTCOUNTY ENERGY
Street Address: 20505 St RD 80
City: LOXAHATCHEE State: FL Zip: 33470

Process: NG Unit#: 3 B Operating Mode: BASE W/DB
Control Equipment: HRSG Operating Mode: BASE

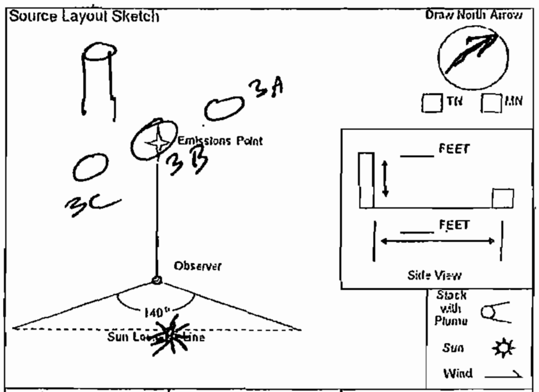
Describe Emissions Point: CENTER STACK, GREY COLOR

Height of Emiss. Pt. Start 150 FT End 150 FT
Height of Emiss. Pt. Rel. to Observer Start 150 FT End 150 FT
Distance to Emiss. Pt. Start [illegible]500 FT End [illegible] 500 FT
Direction to Emiss. Pt. (Degrees) Start 325 NW End 325 NW
Vertical Angle to Obs. Pt. Start 2 End 2°
Direction to Obs. Pt. (Degrees) Start ~~185~~ 325NW End ~~185~~ 325NW
Distance and Direction to Observation Point from Emission Point
Start 500 FT @ ~~185~~ 325 NW End 500 FT @ ~~186~~ 325 NW

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start SKY End SKY
Background Color Start BLUE End BLUE
Sky Conditions Start PARTLY CLOUDY End PARTLY CLOUDY
Wind Speed Start 2-4 MPH End 2-4 MPH
Wind Direction Start NW End NW
Ambient Temp. Start 61°F End 70°F
Wet Bulb Temp.
RH Percent 83

Source Layout Sketch



Latitude: 26°41N Longitude: 80°22'W Declination:

Additional Information:

VISUAL EMISSIONS OBSERVATION FORM

Form Number: Page 2 of 6
Continued on Form Number: bV-10-WESTCOUNTY.FL-3B-DB-1
Observation Date: 20 MARCH 2011 Time Zone: EST Start Time: 9:00 AM End Time: 10:00 AM

Min \ Sec	0	15	30	45	Comments
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): GIRIDHAR JAYARAMAN
Observer's Signature: Giridhar Date: 3/20/11
Organization: AHI
Certified By: ETA Date:

Method Used (~~Circle One~~)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL

Facility Name WEST COUNTY ENERGY

Street Address 20505 ST RD 80

City LOXAHATCHEE State FL Zip 33470

Process NG. Unit # 3B Operating Mode BASE w/DB

Control Equipment HRSG Operating Mode BASE

Describe Emissions Point CENTER STACK, GREY COLOR

Height of Emiss. Pt. Start 150 FT End 150 Height of Emiss. Pt. Rel. to Observer Start 150 End 150

Distance to Emiss. Pt. Start 500 FT End 500 Direction to Emiss. Pt. (Degrees) Start 325NW End 325NW

Vetical Angle to Obs. Pt. Start 2 End 2° Direction to Obs. Pt. (Degrees) Start ~~145~~ 325NW End ~~185~~ 325NW

Distance and Direction to Observation Point from Emission Point Start 500 @ ~~145~~ 325NW End 500 FT @ ~~145~~ 325NW

Describe Emissions Start N.V End N.V

Emission Color Start N.V End N.V Water Droplet Plume Start NONE End NONE

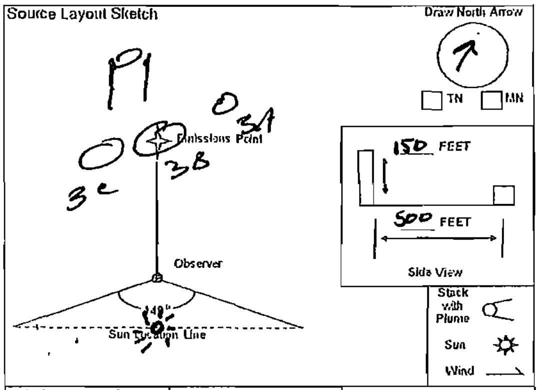
Describe Plume Background Start SKY End SKY

Background Color Start BLUE End BLUE Sky Conditions Start CLEAR End PARTLY CLOUDY

Wind Speed Start 6-7MPH End 6-7MPH Wind Direction Start NNW End NNW

Ambient Temp. Start 73°F End 78°F Wet Bulb Temp. RH Percent 69%

Source Layout Sketch



Latitude 26° 41' N Longitude 80° 22' W Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number Page 3 of 6

Continued on Form Number bu-10-WESTCOUNTY.FL-3B-DB-2

Observation Date 20 MARCH 2011 Time Zone EST Start Time 10:08 AM End Time 11:07 AM

Min \ Sec	0	15	30	45	Comments
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) GIRIDHAR JAYARAMAN

Observer's Signature Date 3/20/11

Organization A.H.I

Certified By ETA Date

Method Used (Circle One)
[✓ Method 9]   203A   203B   Other: ________

VISUAL EMISSIONS OBSERVATION FORM

Form Number
Page 4 of 6

Continued on Form Number 60-10-WEST COUNTY . FL - 3B - DB-2

Company Name FPL

Facility Name WESTCOUNTY ENERGY

Street Address 20505 St RD 80

City LOXAHATCHEE State FL Zip 33470

Process NG   Unit # 3B   Operating Mode BASE W/DB

Control Equipment HRSG   Operating Mode -BASE

Describe Emissions Point CENTER STACK GREY COLOR

Height of Emiss. Pt. Start 150FT End 150FT

Height of Emiss. Pt. Rel. to Observer Start 150FT End 150FT

Distance to Emiss. Pt. Start 500FT End 500FT

Direction to Emiss. Pt. (Degrees) Start 325NW End 325NW

Vertical Angle to Obs. Pt. Start 2° End 2°

Direction to Obs. Pt. (Degrees) Start ~~185~~ 325NW End ~~185~~ 325NW

Distance and Direction to Observation Point from Emission Point Start 500FT @ ~~185~~ 325NW End 500FT @ ~~185~~ 325NW

Describe Emissions Start NV End NV

Emission Color Start NV End NV

Water Droplet Plume Start NONE End NONE

Describe Plume Background Start SKY End SKY

Background Color Start BLUE End BLUE

Sky Conditions Start ~~CLEAR~~ PARTLY CLOUDY End CLEAR PARTLY CLOUDY

Wind Speed Start 6-7MPH End 6-7MPH

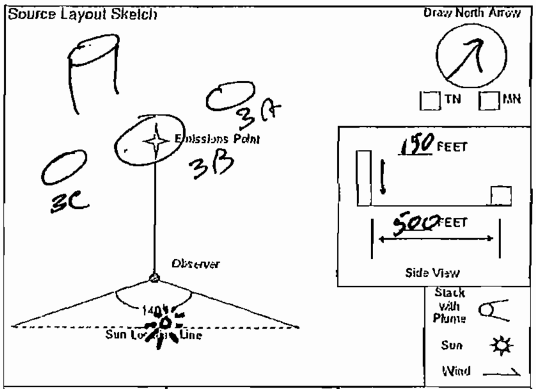
Wind Direction Start NNW End NNW

Ambient Temp. Start 73°F End 78°F

Wet Bulb Temp.

RH Percent 69%

Source Layout Sketch



Latitude 26°41'N   Longitude 80° 22' W   Declination

Additional Information

Observation Date 20 MARCH 2011   Time Zone EST   Start Time 10:08AM   End Time 11:07AM

Min \ Sec	0	15	30	45	Comments
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) GIRIDHAR JAYARAMAN

Observer's Signature   Date 3/20/11

Organization AAE

Certified By ETA   Date

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ______

Company Name FPL

Facility Name WESTCOUNTY ENERGY

Street Address 20505 ST RD 80

City LOXAHATCHEE State FL Zip 33470

Process NG Unit # 3B Operating Mode BASE W/DB

Control Equipment HRSG Operating Mode BASE

Describe Emissions Point CENTER STACK, GREY COLOR

Height of Emiss. Pt. Start 150FT End 150FT

Height of Emiss. Pt. Rel. to Observer Start 150 FT End 150 FT

Distance to Emiss. Pt. Start 500 FT End 500FT

Direction to Emiss. Pt. (Degrees) Start 325NW End 325 NW

Vertical Angle to Obs. Pt. Start 2° End 2°

Direction to Obs. Pt. (Degrees) Start 185 End 185° 325NW 325NW

Distance and Direction to Observation Point from Emission Point Start 500FT @ 185 325NW End 500FT @ 185 325NW

Describe Emissions Start NV End NV

Emission Color Start NV End NV

Water Droplet Plume Start NONE End NONE

Describe Plume Background Start SKY End SKY

Background Color Start BLUE End BLUE

Sky Conditions Start CLEAR End CLEAR

Wind Speed Start 8-10MPH End 8-10MPH

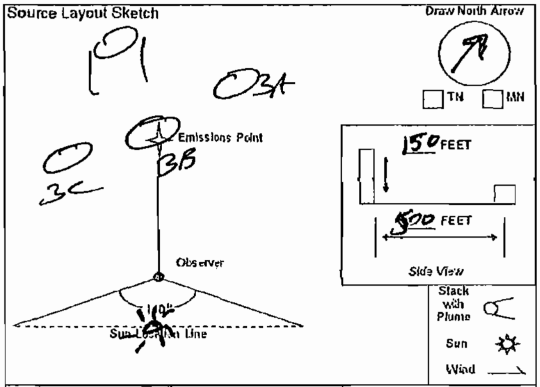
Wind Direction Start NE End NE

Ambient Temp. Start 80°F End

Wet Bulb Temp.

RH Percent 65%

Source Layout Sketch



Latitude 26°41'N Longitude 80°22' W Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number

Page 5 of 6

Continued on Form Number bv-10-WESTCOUNTYFL-3B-DB-3

Observation Date 20 MARCH-2011 Time Zone EST Start Time 11:17AM End Time 12:16 PM

Min \ Sec	0	15	30	45	Comments
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) GIRIDHAR JAYARAMAN

Observer's Signature

Date 3/20/11

Organization A HI

Certified By ETA

Date

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ____________

Company Name FPL

Facility Name WESTCOUNTY ENERGY

Street Address 20505 SI-RD 80

City LOXAHATCHEE State FL Zip 33470

Process NG Unit # 3B Operating Mode BASE W/DB

Control Equipment HRSG Operating Mode BASE

Describe Emissions Point CENTER STACK, GREY COLOR

Height of Emiss. Pt. Start 150 FT End 150 FT

Height of Emiss. Pt. Rel. to Observer Start 150 FT End 150 FT

Distance to Emiss. Pt. Start 500 FT End 500 FT

Direction to Emiss. Pt. (Degrees) Start 325 NW End 325 NW

325 NW 325 NW

Vetical Angle to Obs. Pt. Start 2° End 2°

Direction to Obs. Pt. (Degrees) Start 185° End 185°

Distance and Direction to Observation Point from Emission Point Start 500 FT @ 185° End 500 FT @ 185°

325 NW 325 NW

Describe Emissions Start N.V End N.V

Emission Color Start N.V End N.V

Water Droplet Plume Start NONE End NONE

Describe Plume Background Start SKY End SKY

Background Color Start BLUE End BLUE

Sky Conditions Start CLEAR End CLEAR

Wind Speed Start 6-10 MPH End 8-10 MPH

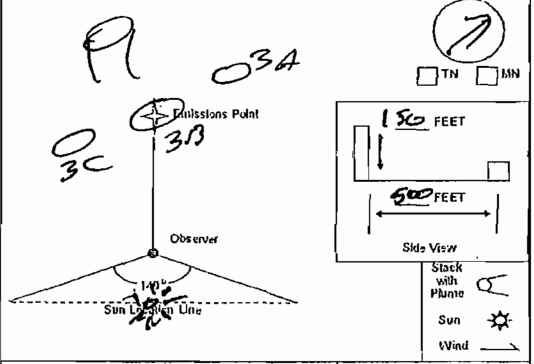
Wind Direction Start NE End NE

Ambient Temp Start 80°F End 81°F

Wet Bulb Temp.

RH Percent 55%

Source Layout Sketch



Latitude 26°41'N

Longitude 80°22' W

Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number

Page 6 of 6

Continued on Form Number VU - 10 - WESTCOUNTY - PL - 3B - DB-3

Observation Date 20 MARCH 2011

Time Zone EST

Start Time 11:17 AM

End Time 12:16 PM

Min \ Sec	0	15	30	45	Comments
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) GIRIDHAR JAYARAMAN

Observer's Signature

Date 3/20/11

Organization ANI

Certified By ETA

Date

CALCULATIONS

EXAMPLE CALCULATIONS (FFACTOR)

RM 19, (12-17-09), 2.0 Summary of Method, 2.1 Emission Rates. Oxygen (O_2) or carbon dioxide (CO_2) concentrations and appropriate F factors (ratios of combustion gas volumes to heat inputs) are used to calculate pollutant emission rates from pollutant concentrations.

RM 19, (12-17-09), 12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in lb/MMBtu. The pollutant concentration must be in lb/scf and the F factor must be in scf/MMBtu. If the pollutant concentration (C) is not in the appropriate units, use Table 19–1 in Section 17.0 to make the proper conversion. An F factor is the ratio of the gas volume of the products of combustion to the heat content of the fuel. The dry F factor (F_d) includes all components of combustion less water, the wet F factor (F_w) includes all components of combustion, and the carbon F factor (F_c) includes only carbon dioxide.

Mark's Std Hdbk, 10th ed.,pg 4-26

High Heat Value Dry (HHV_{dry}), calc for Methane (single component for the fuel gas)

$$HHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times GCM\right]$$

$$HHV_{dry}=\frac{97.44\ \%}{100.00}\times\frac{994.85\ Btu}{SCF}=\frac{969.38\ \ Btu}{SCF}$$

Mark's Std Hdbk, 10th ed., pg 4-26

Low Heat Value Dry (LHV_{dry}), calc for Methane (single component for the fuel gas)

$$LHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times NCM\right]$$

$$LHV_{dry}=\frac{97.44\ \%}{100.00}\times\frac{895.75\ Btu}{SCF}=\frac{872.82\ \ Btu}{SCF}$$

Civil Eng. Ref. Man.,7th Ed.,pg 14-9/GPA Ref. Bulletin 181-86, App. C

High Heat Value Wet (HHV_{wet}), calc for entire sample (all components of the fuel gas)

$$HHV_{wet}(Btu/SCF)=\frac{HHV_{dry}}{W/D.factor}$$

$$HHV_{wet}=\frac{987.84\ Btu/SCF}{1.0236}=965.07\ Btu/SCF$$

Civil Eng. Ref. Man.,7th Ed.,pg 14-9/GPA Ref. Bulletin 181-86, App. C

Low Heat Value Wet (LHV_{wet}), calc for entire sample (all components of the fuel gas)

$$LHV_{wet}(Btu/SCF)=\frac{LHV_{dry}}{W/D.factor}$$

$$LHV_{wet}=\frac{889.73\ Btu/SCF}{1.0236}=869.22\ Btu/SCF$$

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

$$CM(lb/lb-mol)=\left[\left(\frac{M_{\%}}{100}\right)\times MW\right]$$

$$CM=\frac{97.44\ \%}{100.00}\times\frac{16.04\ \ lb}{lb\text{-}mol}=15.63\ \ lb/lb\text{-}mol$$

ASTM D 3588

Fuel Molecular Weight (MW_{Fuel})

$$MW_{Fuel}(lb/lb\cdot mol)=\left[\sum(CM)\right]$$

MW_{Fuel} = 15.63 lb/lb-mol

\+ 0.26 lb/lb-mol

\+ etc. = 16.547 lb/lb-mol

Btu per Lb of Gas Gross (**GCV**)

$$GCV(Btu/lb)=\left[\frac{HHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$GCV=\frac{987.84\ Btu/SCF\ \ x\ \ 385.23\ ft^3/lbmol}{16.547\ lb/lb\text{-}mol}=22{,}998.21\ Btu/lb$$

ASTM D 3588 (SG)

Specific Gravity

$$SG=\left[\frac{MW_{Fuel}}{MW_{AIR}}\right]$$

$$SG=\frac{16.55\ lb/lb\text{-}mol}{28.96\ lb/lb\text{-}mol}=0.5713$$

Btu per Lb of Gas Net (**NCV**)

$$NCV(Btu/lb)=\left[\frac{LHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$NCV=\frac{889.73\ Btu/SCF\ \ x\ \ 385.23\ ft^3/lbmol}{16.547\ lb/lb\text{-}mol}=20{,}714.11\ Btu/lb$$

Weight Percent of Component ($C_{\%}$), methane

$$C_{\%}(\%)=\left[\left(\frac{CM}{MW_{Fuel}}\right)\times 100\right]$$

$$C_{\%}=\frac{15.63\ lb/lb\text{-}mol}{16.55\ lb/lb\text{-}mol}\ \ x\ \ 100\ =\ 94.47\ \%$$

Weight Percent of Volatile Organic Compounds ($VOC_{\%}$)

$$VOC_{\%}(\%)=\left[\sum_{C_3H_8}^{C_8H_{18}}M_{\%}\right]$$

$VOC_{\%}$ = 0.23 % + 0.03 % + 0.05 % + etc. = 0.34 %

RM 19, (12-17-09), 12.3.2 Determined **F Factors**. If the fuel burned is not listed in Table 19–2 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19–2, use the procedure below: 12.3.2.1 Equations. Use the eq

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

RM 19, (07-19-6), 12.1 Nomenclature

K (scf/lb)/%

H	3.64
C	1.53
S	0.57
N_2	0.14
O_2	0.46

$$F_d=\frac{10^6Btu}{MMBtu}\times\left[\frac{3.64\ SCF}{lb\cdot\%}\times 24.13\ \%+\frac{1.53\ SCF}{lb\ \ \%}\times 72.99\ \%+\frac{0.57\ SCF}{lb\cdot\%}\times 0.00\ \%+\frac{0.14\ SCF}{lb\cdot\%}\times 1.01\ \%-\frac{0.46\ SCF}{lb\cdot\%}\times 1.88\ \%\right]\times\frac{lb}{22{,}998.21\ Btu}=\frac{8{,}642.84\ SCF}{MMBtu}$$

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

EXAMPLE CALCULATIONS (INFORMATION)

Specific Humidity (RH_{sp})

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

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

$$RH_{sp} = \frac{66.54\ \text{gr}}{\text{lb}} \times \frac{\text{l lb}}{7000\ \text{gr}} = 0.009505 \frac{\text{lb } H_2O}{\text{lb Air}}$$

Fuel Flow Conversion (Q_f)

Note: Qf(lb/min) is a value obtained from the source operator.

$$Q_f = \left[Q_f \times G \times \left(\frac{1}{MW_{Fuel}}\right)\right]$$

$$Q_f = \frac{1{,}885.39\ \text{lb}}{\text{min}} \times \frac{60\ \text{min}}{\text{hr}} \times \frac{385.23\ \text{ft}^3}{\text{lb-mol}} \times \frac{\text{lb-mol}}{16.55\ \text{lb}} = 2{,}633{,}655\ \text{SCFH}$$

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.

$$CIP / CDP = \left[(psig + P) \times \frac{51.71493\ mmHg}{1\ psi}\right]$$

$$\text{CIP / CDP} = \left[275.9\ \text{psig} + 14.8574\right] \times \frac{51.71493\ \text{mmHg}}{1\ \text{psia}} = 15{,}037\ \text{mmHg (abs)}$$

Heat Rate (MMBtu/hr)

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

$$\text{Heat Rate} = \frac{889.73\ \text{Btu}}{\text{SCF}} \times \frac{2{,}633{,}654.67\ \text{SCF}}{\text{hr}} \times \frac{\text{MMBtu}}{10^6\ \text{Btu}} = \frac{2{,}343.25\ \text{MMBtu}}{\text{hr}}$$

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)

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

$$\text{ACE} = \frac{5.00\ \text{ppm} - 4.93\ \text{ppm}}{12.10\ \text{ppm}} \times 100 = 0.58\ \%$$

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)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)}$$

Eq. of a line
y=mx+b

$$E_p = \frac{8.44\ \text{ppm} - -0.03\ \text{ppm}}{8.46\ \text{ppm} - 0.00\ \text{ppm}} \times 4.76\ \text{ppm} + -0.03 = 4.74\ \text{ppm}$$

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

$$ACE_{THC} = \frac{4.88\ \text{ppm} - 4.74\ \text{ppm}}{4.76\ \text{ppm}} \times 100 = 3.03\ \%$$

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)

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

$$SB = \frac{4.93 \text{ ppm} - 5.00 \text{ ppm}}{12.10 \text{ ppm}} \times 100 = -0.58 \ \%$$

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)

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

$$D = | \ -0.58 \ \% - -0.58 \ \% \ | = 0.00 \ \%$$

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)

$$SB / D_{Alt} = \left| C_S - C_{Dir} \right| \qquad \text{Eq. Section 13.2 and 13.3}$$

$$SB / D_{Alt} = | \ 4.93 \text{ ppm} - 5.00 \text{ ppm} \ | = 0.07 \text{ ppm}$$

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)

$$C_{Gas} = \left(C_{Avg} - C_O \right) \times \left(\frac{C_{MA}}{C_M - C_O} \right) \qquad \text{Eq. 7E-5b}$$

$$C_{Gas} = \left(2.45 \text{ ppm} - 0.08 \text{ ppm} \right) \times \left(\frac{4.93 \text{ ppm}}{4.93 \text{ ppm} - 0.08 \text{ ppm}} \right) = 2.41 \text{ ppm}$$

EXAMPLE CALCULATIONS (RUNS)

Stack Exhaust Flow (Q_S) - RM19

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000} \right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}} \right)$$

$$Q_S = \frac{8{,}642.84 \text{ SCF}}{\text{MMBtu}} \times \frac{2{,}633{,}654.67 \text{ SCF}}{\text{hr}} \times \frac{987.84 \text{ Btu}}{\text{SCF}} \times \frac{\text{MMBtu}}{10^6 \text{ Btu}} \times \left[\frac{20.90\%}{20.9\% - 13.1 \ \%} \right] = 60{,}185{,}110.66 \text{ SCFH}$$

Diluent-Corrected Pollutant Concentration, O_2 Based

RM 20, (11-26-02), 7.3.1 Correction of Pollutant Concentration Using O_2 Concentration. Calculate the O_2 corrected pollutant concentration, as follows: (calc for NOx gas, Run 1, if applicable)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}} \right) \qquad \text{Eq. 20-4}$$

$$C_{adj} = 2.41 \text{ ppm} \times \left(\frac{20.9\% - 15.00 \ \%}{20.9\% - 13.09 \ \%} \right) = 1.82 \text{ ppm@}15\%O_2$$

Diluent-Corrected Pollutant 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)

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

$$C_{ISO} = 1.82 \text{ ppm@}15\%O_2 \times \left(\sqrt{\frac{\frac{275.9 \text{ psig} + 14.69232 \text{ psi}}{0.01933677 \text{ psi/mm Hg.}}}{\frac{275.9 \text{ psig} + 14.8574 \text{ psi}}{0.01933677 \text{ psi/mm Hg.}}}} \right) \times 2.718^{(19x(\ 0.009505 \text{ lb/lb} - 0.00633))} \times \left(\frac{288 \text{ K}}{297 \text{ K}} \right)^{1.53} = 1.84 \text{ ppm@15\% and ISO}$$

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)

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

$$E_{lb/hr} = \frac{2.41 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{60{,}185{,}111 \text{ SCFH} \times 46.01 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{17.29 \text{ lb}}{\text{hr}}$$

Emissions Rate (ton/year)

Calculation for tons per year emission rate based on 8760 hours per year. Calculate, as follows: (calc for NOx gas Run 1, if applicable)

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

$$E_{ton/yr} = \frac{17.29 \text{ lb}}{\text{hr}} \times \frac{8{,}760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}} = \frac{75.75 \text{ ton}}{\text{year}}$$

Emissions Rate (lb/MMBtu)

RM 19, (12-17-09), 12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in ng/J (lb/million Btu). (calc for NOx gas Run 1, if applicable)

Oxygen Based

12.2.1 Oxygen-Based F Factor, Dry Basis. When measurements are on a dry basis for both O_2 (%O_2d) and pollutant (Cd) concentrations, use the following equation:

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}} \qquad \text{Eq. 19-1}$$

$$E_{lb/MMBtu} = \frac{2.41 \text{ ppm} \times 8{,}642.84 \text{ SCF/MMBtu} \times 0.0000001194 \text{ lb/ppm*ft}^3 \times 20.9\%}{20.9\% - 13.09\ \%} = \frac{0.007 \text{ lb}}{\text{MMBtu}}$$

Conversion Constant

Convc for NOx

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

$$Conv_c = \frac{\frac{46.01 \text{ lb}}{\text{lb•mole}} \times \frac{\text{lb•mole}}{385.23 \text{ SCF}}}{10^6} = \frac{0.0000001194 \text{ lb}}{\text{ppm-ft}^3}$$

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

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

$$D(in.) = L_{fw} - L_{nw}$$

D (in.) = 282.38 in. - 19.00 in. = 263.38 in.

Stack Diameters Downstream

$$B_D(dia.) = \frac{B}{D}$$

$$B_D \text{ (dia.)} = \frac{531.75 \text{ in.}}{263.38 \text{ in.}} = 2.02 \text{ diameters}$$

Area of Stack (ft^2)

$$A_s(ft^2) = \pi \times \left(\frac{D}{2 \times 12}\right)^2$$

2

$$A_s \text{ (ft}^2\text{)} = 3.14 \times \left(\frac{263.38 \text{ in.}}{2 \times 12\text{in./ft}} \right)^2 = 378.35 \text{ ft}^2$$

Stack Diameters Upstream

$$A_D(dia.) = \frac{A}{D}$$

$$A_D \text{ (dia.)} = \frac{144.00 \text{ in.}}{263.38 \text{ in.}} = 0.55 \text{ diameters}$$

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

EXAMPLE CALCULATIONS (Reference Method 3a) [Values from Run 1 test]

Carbon Monoxide Concentration (%)

$$\%CO = \frac{ppmCO}{10{,}000}$$

$$\%CO\ (\%) = \frac{0.58\ \text{ppm}}{10{,}000\ \text{ppm}/\%} = 0.0000\ \%$$

Nitrogen Concentration (%)

$$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$$

$$\%N_2\ (\%) = 100 - 4.53\ \% - 13.09\ \% - 0.58\ /\ 10{,}000\ \% = 82.38\ \%$$

Stack Dry Molecular Weight (lb/lb-mole)

$$M_d\,(lb / lb - mol) = \sum\left(\frac{MW_{comp}}{100} \times \%component\right)$$

$$M_d\ (\text{lb/lb-mol}) = \left(\frac{44\ \text{lb/lb-mol}}{100} \times 4.53\ \%\right) + \left(\frac{32\ \text{lb/lb-mol}}{100} \times 13.09\ \%\right) + \left(\frac{28\ \text{lb/lb-mol}}{100} \times \left[\frac{0.58}{10{,}000} + 82.38\right]\right) = \frac{29.25\ \text{lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

$$M_S\,(lb / lb - mol) = \left[M_d \times \left(1 - \frac{B_{WS}}{100}\right)\right] + \left[MW_{H_2O} \times \frac{B_{WS}}{100}\right]$$

$$M_S\ (\text{lb/lb-mol}) = \left\{\frac{29.25\ \text{lb}}{\text{lb-mol}} \times \left(1 - \frac{9.53\ \%}{100}\right)\right\} + \left\{\frac{18\ \text{lb}}{\text{lb-mol}} \times \frac{9.53\ \%}{100}\right\} = \frac{28.18\ \text{lb}}{\text{lb-mol}}$$

Average Calculated Fuel Factor (F_o)

$$F_{o(avg)} = \frac{\left[20.9 - (\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}{(\%CO_2)_{avg} + (\%CO)_{avg}}$$

$$F_{o(avg)} = \frac{20.9\% - 13.09\ \% - (0.5 \times 0.000\ \%)}{4.53\ \% + 0.000\ \%} = 1.720$$

Average Excess Air (%)

$$\%EA_{avg}(\%) = \frac{100 \times \left[(\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}{\left(0.264 \times (N_2)_{avg}\right) - \left[(\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}$$

$$(\%EA)_{AVG} = \frac{100 \times \{13.09\ \% - (0.5 \times 0.000\ \%)\}}{(0.264 \times 82.38\ \%) - \{13.09\ \% - (0.5 \times 0.000\ \%)\}} = 151.18\ \%$$

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

EXAMPLE CALCULATIONS (Reference Method 2) [Values from Run 1 test]

Absolute Stack Pressure (in. Hg)

$$P_S\,(in.Hg) = P_b + \frac{P_{static}}{13.6}$$

$$P_s\text{ (in. Hg)} = 30.23\text{ in. Hg} + \frac{0.79\quad\text{in. } H_2O}{13.6\text{ in. } H_2O/\text{in. Hg}} = 30.29\quad\text{in. Hg}$$

Average Stack Gas Velocity (ft/sec)

$$v_s\,(ft/\sec) = K_p \times C_p \times \left(\sqrt{\Delta p}\right)_{avg} \times \sqrt{\frac{(t_s)_{avg} + T_u}{P_s \times M_s}}$$

v_{st} (ft/sec) =

$$\left(\frac{85.49\text{ ft}}{\text{sec}}\ \frac{(\text{lb/lb-mol})(\text{in. Hg})}{(^{\circ}\text{R})(\text{in. } H_2O)}\right)^{1/2} \text{x}\ \ 0.84\ \ \text{x}\ \ 0.97\ \ \text{in.}H_2O^{1/2}\ \text{x} \sqrt{\frac{218.58\quad + 460\ ^{\circ}\text{R}}{30.29\quad\text{in. Hg x}\quad 28.18\quad\text{lb/lb-mol}}} = \frac{62.4\quad\text{ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

$$Q_{sd}\,(dscfh) = \frac{60 \times 60 \times \left(1 - \frac{B_{ws}}{100}\right) \times v_s \times A_s \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sd}\text{ (dscf/hr)} = \frac{3600\text{ sec}}{\text{hr}}\ \text{x}\ \left(1 - \frac{9.53\quad\%}{100}\right)\text{x}\ \frac{62.43\quad\text{ft}}{\text{sec}}\ \text{x}\quad 378.35\quad\text{ft}^2\ \text{x}$$

$$\frac{68.00\quad + 460\ ^{\circ}\text{R}}{218.58\quad + 460\ ^{\circ}\text{R}}\ \text{x}\ \frac{30.29\ \text{in. Hg}}{29.92\ \text{in. Hg}} = \frac{60{,}591{,}269.25\quad\text{dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

$$Q_{aw}\,(acfm) = 60 \times v_s \times A_s$$

$$Q_{aw}\text{ (acf/min)} = \frac{60\text{ sec}}{\text{min}}\ \text{x}\ \frac{62.43\quad\text{ft}}{\text{sec}}\ \text{x}\quad 378.35\quad\text{ft}^2 = \frac{1{,}417{,}111.17\quad\text{acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

$$Q_{sw}\,(ascfh) = \frac{60 \times Q_{aw} \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sw}\text{ (ascf/hr)} = \frac{60\text{ min}}{\text{hr}}\ \text{x}\ \frac{1{,}417{,}111.17\text{ acf}}{\text{min}}\ \text{x}$$

$$\frac{68.00\quad + 460\ ^{\circ}\text{R}}{218.58\quad + 460\ ^{\circ}\text{R}}\ \text{x}\ \frac{30.29\ \text{in. Hg}}{29.92\ \text{in. Hg}} = \frac{66{,}972{,}448.70\quad\text{ascf}}{\text{hr}}$$

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

EXAMPLE CALCULATIONS (Reference Method 4) [Values from Run 1 test]

Water Volume Weighed (scf)

$$V_{wsg(std)}(scf) = W_t \times K_5$$

$$V_{wsg(std)} = 101.70\ \text{g} \times 0.04715\ \text{ft}^3/\text{g} = 4.800\ \text{scf}$$

Standard Meter Volume (dscf)

$$V_{m(std)}(dscf) = \frac{K_1 \times Y \times V_m \times \left(P_b + \frac{\Delta H_{avg}}{13.6}\right)}{(t_m)_{avg} + T_u}$$

$$V_{m(std)} = \frac{\frac{17.65\ ^\circ\text{R}}{\text{in. Hg}} \times 0.99 \times 47.05\ \text{dcf} \times \left(30.23\ \text{in. Hg} + \frac{1.94\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\ /\ \text{in. Hg}}\right)}{88.88\ ^\circ\text{F} + 460\ ^\circ\text{R}} = 45.53\ \text{dscf}$$

Calculated Moisture Content (%)

$$B_{ws(calc)}(\%) = 100 \times \frac{V_{wsg(std)}}{V_{wsg(std)} + V_{m(std)}}$$

$$B_{ws(calc)} = 100 \times \frac{4.80\ \text{dscf}}{4.80\ \text{dscf} + 45.53\ \text{dscf}} = 9.53\ \%$$

Saturated Moisture Content (%)

$$B_{ws(svp)}(\%) = 100 \times \frac{10^{6.691 - \frac{3144}{t_{s(avg)} - 390.86}}}{P_b + \frac{P_{static}}{13.6}} \le 100$$

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{218.58\ ^\circ\text{F} + 390.86}\right)}}{30.23\ \text{in. Hg} + \frac{0.79\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\ /\ \text{in. Hg}}} \le 100 = 100.00\ \%$$

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

EXAMPLE CALCULATIONS (Isokinetic Sampling) [Values from Run 1 test]

Desired Orifice (in. H_2O) (first point)

$$\Delta H_d (in.H_2O) = K \times \Delta p$$

ΔH_d (in. H_2O) = 2.01 x 0.94 in. H_2O = 1.89 in. H_2O

Absolute Meter Pressure (in. Hg)

$$P_m (in.Hg) = P_b + \frac{\Delta H@}{13.6}$$

$$P_m\ (in.\ Hg) = 30.23\ in.\ Hg + \frac{1.75\ in.\ H_2O}{13.6\ in.\ H_2O/in.\ Hg} = 30.36\ in.\ Hg$$

Recommended Nozzle Diameter (in.)

$$D_{ni}(in.) = \sqrt{\frac{C_n \times Q_m \times P_m}{(t_m + T_n)\times C_p} \times \left(\frac{1-\frac{B_{wm}}{100}}{1-\frac{B_{ws}}{100}}\right)} \times \sqrt{(t_s + T_n)\times\left[\frac{M_d \times \left(1-\frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}{P_s \times \Delta p_{avg}}\right]}$$

$$D_{ni}\ (in.) = \sqrt{\frac{\frac{0.03575\ (lb\text{-}mole\cdot °R\cdot in.\ H_2O)^{1/2}\cdot min\cdot in.^2}{acf\cdot in.\ Hg^{3/4}\cdot lb^{1/2}} \times 0.75\ acf \times 30.36\ in.\ Hg}{\left[88.88\ °F + 460°R\right] \times 0.84} \times \left(\frac{1 - \frac{0.00\ \%}{100}}{1 - \frac{9.53\ \%}{100}}\right) \times} \sqrt{(218.58\ °F + 460°R) \times \frac{\frac{29.25\ lb}{lb\text{-}mole} \times \left(1 - \frac{9.53\ \%}{100}\right) + \left(\frac{18\ lb}{lb\text{-}mol} \times \frac{9.53\ \%}{100}\right)}{30.29\ in.\ Hg \times 0.97\ in.\ H_2O}} = 0.210\ in.$$

ΔP to ΔH Isokinetic Factor

$$K = C_k \times C_p^2 \times \Delta H@ \times D_{na}^4 \times \left[\frac{M_d \times \left(1-\frac{B_{wm}}{100}\right) + \left(18 \times \frac{B_{wm}}{100}\right)}{M_d \times \left(1-\frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}\right] \times \left(\frac{1-\frac{B_{ws}}{100}}{1-\frac{B_{wm}}{100}}\right)^2 \times \left(\frac{t_m + T_n}{ts + T_n}\right) \times \frac{P_s}{P_m}$$

$$K = \frac{849.8}{in.\ H_2O\cdot in.^4} \times 0.84^2 \times 1.75\ in.\ H_2O \times 0.23^4 \times \left(\frac{1 - \frac{9.53\ \%}{100}}{1 - \frac{0.00\ \%}{100}}\right)^2 \times \frac{88.88\ °F + 460°R}{218.58\ °F + 460°R}\ ) \times$$

$$\left(\frac{\frac{29.25\ lb}{lb/mole} \times \left(1 - \frac{0.00\ \%}{100}\right) + \left(\frac{18\ lb}{lb\text{-}mol} \times \frac{0.00\ \%}{100}\right)}{\frac{29.25\ lb}{lb/mole} \times \left(1 - \frac{9.53\ \%}{100}\right) + \left(\frac{18\ lb}{lb\text{-}mol} \times \frac{9.53\ \%}{100}\right)}\right. \times \frac{30.29\ in.\ Hg}{30.36\ in.\ Hg} = 2.01$$

Cumulative Percent Isokinetic (%) (first point)

$$I(\%) = \frac{K_4 \times ((t_s)_{avg} + T_n) \times V_{m(std)}}{\left(\Theta \times (v_{s(t)})_{avg} \times P_s \times \pi \times \left(\frac{D_{na}}{2} \times \frac{1}{12}\right)^2\right) \times \left(1 - \frac{B_{ws}}{100}\right)}$$

$$I\ (\%) = \frac{\frac{0.0945\ min\cdot in.\ Hg}{sec\cdot °R} \times (221.00\ °F + 460\ °R) \times 1.93\ dscf}{2.50\ min \times \frac{62.19\ ft}{sec} \times 30.29\ in.\ Hg \times 3.14 \times \left(\frac{0.23\ in.}{2} \times \frac{ft.}{12\ in.}\right)^2 \times \left(1 - \frac{9.53\ \%}{100}\right)} = 100.97\ \%$$

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

EXAMPLE CALCULATIONS (CTM-027 Ammonia Analysis) [Values from Run 1 test]

Dry Gas Meter Volume (L)

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

V_m (L) = 45.53 dscf x 28.31685 L/dscf = 1289.31 L

Volume of NH_3 (L)

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

V_a (L) =

$$\left(\frac{4.48 \text{ mg}}{\text{L}} \times \frac{220.00 \text{ ml}}{1} \times \frac{\text{L}}{1000 \text{ ml}} \times \frac{22.4 \text{ L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03 \text{ g}} \times \frac{\text{g}}{1000 \text{ mg}} \right) +$$

$$\left(\frac{0.05 \text{ mg}}{\text{L}} \times \frac{210.00 \text{ ml}}{1} \times \frac{\text{L}}{1000 \text{ ml}} \times \frac{22.4 \text{ L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03 \text{ g}} \times \frac{\text{g}}{1000 \text{ mg}} \right) = 0.0013 \text{ L}$$

NH_3 Concentration (ppmvd)

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

$$C_{NH3} \text{ (ppmvd)} = \frac{0.00 \text{ L}}{1289.31 \text{ L}} \times 10^6 = 1.02 \text{ ppmvd}$$

NH_3 Concentration (ppmvd@15%O_2)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}} \right)$$

$$C_{adj} = 1.02 \text{ ppmvd} \times \left(\frac{20.9\% - 15.00\ \%}{20.9\% - 13.1\ \%} \right) = 0.77 \text{ ppmvd@15\%}O_2$$

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_{WS} = 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_{Dir} = 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 NOx measured in the spiked sample.
C_{Spike} = Concentration of NOx in the undiluted spike gas.
C_{Calc} = *Calculated concentration of NOx 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} = NO_2 to NO converter efficiency, percent.
H = High calibration gas, designator.
L = Low calibration gas, designator.
M = Mid calibration gas, designator.
NOFinal = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.
NOxCorr = The NOx concentration corrected for the converter efficiency.
NOxFinal = The final NOx concentration observed during the converter efficiency test in Section 16.2.2.
NOxPeak = The highest NOx concentration observed during the converter efficiency test in Section 16.2.2.
Q_{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 H_2O/g air
e = transcendental constant, 2.718
T_a = ambient temperature, K

Small Engine and FTIR Nomenclature. The terms used in the equations are defined as follows:

bhp = brake horsepower
hp = horsepower
Q_{sys} = system flow (lpm)
Q_m = matrix spike flow (lpm)

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_{ao}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).
E_{bi} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).
E_{bo} = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).
E_{ci} = Pollutant rate in combined effluent, ng/J (lb/million Btu).
E_{co} = Pollutant emission rate in combined effluent, ng/J (lb/million Btu).
E_d = Average pollutant rate for each sampling period (e.g.,24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (e.g., amount of fuel bunkered), ng/J (lb/million Btu).
E_{di} = Average inlet SO_2 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 (lbs/million Btu) or ppm corrected to 7 percent O_2.
E_{jo},E_{ji} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
E_h = Hourly average pollutant, ng/J (lb/million Btu).
E_{hj} = Hourly arithmetic average pollutant rate for hour "j," ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.
Fc = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19
F_d, F_w, F_c = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).
ft^3 = cubic feet
G = ideal gas conversion factor
(385.23 SCF/lb-mol at 68 deg F & 14.696 psia)
GCM = gross Btu per SCF (constant, compound based)
GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).
GCV_p, GCV_r = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).
$\%_H$ = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.
H_b = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).
H_g = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).
$\%_{H2O}$ = Concentration of water from an ultimate analysis of fuel, weight percent.
H_r = Total numbers of hours in the performance test period (e.g., 720 hours for 30-day performance test period).
K = volume of combustion component per pound of component (constant)
K = Conversion factor, 10^{-5} (kJ/J)/(%) [10^6 Btu/million Btu].
K_c = (9.57 scm/kg)/% [(1.53 scf/lb)/%].
K_{cc} = (2.0 scm/kg)/% [(0.321 scf/lb)/%].
K_{hd} = (22.7 scm/kg)/% [(3.64 scf/lb)/%].
K_{hw} = (34.74 scm/kg)/% [(5.57 scf/lb)/%].
K_n = (0.86 scm/kg)/% [(0.14 scf/lb)/%].
K_c = (2.85 scm/kg)/% [(0.46 scf/lb)/%].
K_s = (3.54 scm/kg)/% [(0.57 scf/lb)/%].
K_{sulfur} = $2x10^4$ Btu/wt%-MMBtu
K_w = (1.30 scm/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 = barometirc pressure, in Hg
P_s = Potential SO2 emissions, percent.
$\%_S$ = Sulfur content of as-fired fuel lot, dry basis, weight percent.
S_e = 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 inlat 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}=CO_2 Correction factor, percent.
X_k = Fraction of total heat input from each type of fuel k.

Calculations, Formulas, and Constants

The following information supports the spreadsheets for this testing project.

Given Data:

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

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

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

ASTM D 3588

Molecular Weight of NOx (lb/lb-mole) = 46.01
Molecular Weight of CO (lb/lb-mole) = 28.00
Molecular Weight of SO_2 (lb/lb-mole) = 64.00
Molecular Weight of THC (propane) (lb/lb-mole) = 44.00
Molecular Weight of VOC (methane) (lb/lb-mole) = 16.00
Molecular Weight of NH_3 (lb/lb-mole) = 17.03
Molecular Weight of HCHO (lb/lb-mole) = 30.03

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

Conversion Constant for NOx = 0.0000001194351
Conversion Constant for CO = 0.0000000726839
Conversion Constant for SO_2 = 0.0000001661345
Conversion Constant for THC = 0.0000001142175
Conversion Constant for VOC (methane) = 0.0000000415336
Conversion Constant for NH_3 = 0.0000000442074
Conversion Constant for HCHO = 0.0000000779534
NOTE: units are lb/ppm*ft^3

Formulas:

1. Corrected Raw Average (C_{Gas}), 40CFR60, App. A, RM 7E, Eq. 7E-5 (08/15/06)

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

2. Correction to % O_2, 40CFR60, App. A, RM 20, Eq. 20-5 (11/26/02)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

3. Correction to % O_2 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)

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000}\right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}}\right)$$

5. Emission Rate in lb/hr

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

6. Emission Rate in tons per year

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

7. Emission Concentration in lb/MMBtu (O_2 based)

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}}$$

8. Emission Concentration in g/hp*hr

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

RATA SHEET CALCULATIONS

d = Reference Method Data - CEMS Data
S_d = Standard Deviation
CC = Confident Coefficient
n = number of runs
$t_{0.025}$ = 2.5 percent confidence coefficent T-values
RA = relative accuracy
ARA = alternative relative accuracy
BAF = Bias adjustment factor

n	t	n	t	n	t
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

1. Difference

$$d = \sum_{i=1}^{n} d_i$$

2. Standard Deviation

$$S_d = \sqrt{\frac{\sum_{i=1}^{n} d_i^2 - \left[\frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}\right]}{n-1}}$$

3. Confident Coefficient

$$CC = t_{0.025} \times \frac{S_d}{\sqrt{n}}$$

4. Relative Accuracy

$$RA = \frac{|d_{AVG}| + |CC|}{RM_{AVG}} \times 100$$

5. Alternative Relative Accuracy

$$ARA = \frac{|d_{AVG}| + |CC|}{AS} \times 100$$

5. Bias Adjustment Factor

$$BAF = 1 + \left(\frac{|d_{AVG}|}{CEM_{AVG}}\right)$$

Nomenclature

- %CO = carbon monoxide concentration (%)
- $\%CO_2$ = carbon dioxide concentration (%)
- $\%N_2$ = nitrogen concentration (%)
- $\%O_2$ = oxygen concentration (%)
- $\%O_{2,wet}$ = Oxygen content of gas stream, % by volume of wet gas. (Note: The oxygen percentage used in Method 201A, Equation 3 is on a wet gas basis. That means that since oxygen is typically measured on a dry gas basis, the measured percent O2 must be multiplied by the quantity $(1 - B_{ws})$ to convert to the actual volume fraction. Therefore, $\%O_{2,wet} = (1 - B_{ws}) * \%O_{2,\,dry}$)
- $(\%EA)_{avg}$ = average excess air (%)
- $(F_o)_{avg}$ = average calculated fuel factor
- $[(\Delta p)^{0.5}]_{avg}$ = Average of square roots of the velocity pressures measured during the preliminary traverse, inches W.C.
- μ = Gas viscosity, micropoise
- 12.0 = Constant calculated as 60 percent of 20.5 square inch cross-sectional area of combined cyclone head, square inches
- 17.03 = mg/milliequivalents for ammonium ion
- 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)
- 5.02×10^4 = constant derived from the molecular weight and correcting standard temperature and pressure (ref. Bay Area Air Quality Management District, Source Test Procedure ST-1B, Ammonia Integrated Sampling, Adopted January 20, 1982, Regulation 7-303)
- A = distance upstream (in.)
- A_D = stack diameters upstream (dia.)
- An = Area of nozzle, square feet
- A_s = area of stack (ft^2)
- B = distance downstream (in.)
- B_D = stack diameters downstream (dia.)
- b_f = Average blockage factor calculated in Equation 26, dimensionless
- B_{wm} = meter moisture content (%)
- B_{ws} = stack moisture content (%)
- C = Cunningham correction factor for particle diameter, Dp, and calculated using the actual stack gas temperature, dimensionless
- C_1 = -150.3162 (micropoise)
- C_2 = 18.0614 (micropoise/$K^{0.5}$) = 13.4622 (micropoise/$R^{0.5}$)
- $C_3 = 1.19183 \times 10^6$ (micropoise/K^2) = 3.86153×10^6 (micropoise/R^2)
- C_4 = 0.591123 (micropoise)
- C_5 = 91.9723 (micropoise)
- $C_6 = 4.91705 \times 10^{-5}$ (micropoise/K^2) = 1.51761×10^{-5} (micropoise/R^2)
- C_a = Acetone blank concentration, mg/mg
- C_b = Concentration of NH3 ion in the back half of train (breakthrough)
- C_f = Concentration of NH3 ion in the front half of train (main catch)
- C_{fPM10} = Conc. of filterable PM_{10}, gr/dscf
- $C_{fPM2.5}$ = Conc. of filterable $PM_{2.5}$, gr/dscf
- C_k = K Factor Constant, 849.8

Nomenclature

- C_n = nozzle diameter constant, 0.03575
- C_p' = Coefficient for the pitot used in the preliminary traverse, dimensionless
- C_p = Pitot coefficient for the combined cyclone pitot, dimensionless
- C_{cpm} = Concentration of the condensable PM in the stack gas, dry basis, corrected to standard conditions, milligrams/dry standard cubic foot.
- C_r = Re-estimated Cunningham correction factor for particle diameter equivalent to the actual cut size diameter and calculated using the actual stack gas temperature, dimensionless
- D_{50} = Particle cut diameter, micrometers
- $D_{50(N+1)}$ = D_{50} value for cyclone IV calculated during the N+1 iterative step, micrometers
- D_{50-1} = Re-calculated particle cut diameters based on re-estimated C_r, micrometers
- D_{50LL} = Cut diameter for cyclone I corresponding to the 2.25 micrometer cut diameter for cyclone IV, micrometer
- D_{50N} = D_{50} value for cyclone IV calculated during the Nth iterative step, micrometers
- D_{50T} = Cyclone I cut diameter corresponding to the middle of the overlap zone shown in Method 201A, Figure 10 of Section 17, micrometers
- D_e = equivalent stack diameter (in.)
- $\Delta H@$ = ΔH @ 0.75 scfm (in. H2O)
- ΔH_{avg} = average orifice pressure (in. H_2O)
- D_n = Inner diameter of sampling nozzle mounted on Cyclone I, inches
- D_{na} = actual nozzle diameter (in.)
- D_p = Physical particle size, micrometers
- Δp = velocity head (in. H_2O)
- Δp_1 = velocity head at first current traverse point (in. H_2O)
- $\Delta p'_1$ = velocity head at first preliminary traverse point (in. H_2O)
- Δp_{avg} = average pitot tube differential pressure (in. H_2O)
- Δp_n = velocity head at subsequent current traverse point (in. H_2O)
- Δp_{RM2} = method 2 velocity head (in. H_2O)
- D_s = diameter of stack (in.)
- F_d = fuel f-factor (dscf/MMBtu)
- f_{O2} = stack gas fraction of O_2, by volume, dry basis
- I = Percent isokinetic sampling, dimensionless
- K_1 = standard volume correction, 17.65°R/in. Hg
- K_4 = isokinetic conversion constant, 0.0945min•in.Hg/sec•°R
- K_5 = water mass to std water vapor, 0.04715 ft^3/g
- K_p = 85.49, ((ft/sec)/(pounds/mole -°R))
- L = length of stack (in.)
- L_{fw} = distance to far wall of stack (in.)
- L_{nw} = distance to near wall of stack (in.) [reference]
- $m_{\#x}$ = weight measurements (g)
- M_1 = Milligrams of PM collected on the filter, less than or equal to 2.5 micrometers
- M_2 = Milligrams of PM recovered from Container #2 (acetone blank corrected), greater than 10 micrometers
- M_3 = Milligrams of PM recovered from Container #3 (acetone blank corrected), less than or equal to 10 and greater than 2.5 micrometers

Nomenclature

- M_4 = Milligrams of PM recovered from Container #4 (acetone blank corrected), less than or equal to 2.5 micrometers
- m_a = Mass of residue of acetone after evaporation, mg
- m_c = Mass of the NH4+ added to sample to form ammonium sulfate, mg
- m_{cpm} = Mass of the total condensable PM, mg
- M_d = Molecular weight of dry gas, pounds/pound mole
- m_{fb} = Mass of total CPM in field train recovery blank, mg
- m_{fx} = final weight, avg of last two measurements (g)
- mg = Milligram
- mg/L = Milligram per liter
- m_i = Mass of inorganic CPM, mg
- m_{ib} = Mass of inorganic CPM in field train recovery blank, mg
- M_n = total particulates (mg)
- m_o = Mass of organic CPM, mg
- m_{ob} = Mass of organic CPM in field train blank, mg
- m_r = Mass of dried sample from inorganic fraction, mg
- m_{tx} = tare weight (g)
- MW = molecular weight (lb/lb-mole)
- M_w = Molecular weight of wet gas, pounds/pound mole
- N = Normality of ammonium hydroxide titrant
- N_a = null angle (deg.)
- N_{re} = Reynolds number, dimensionless
- N_{tp} = Number of iterative steps or total traverse points
- P_b = P_{bar} = barometric pressure (in. Hg)
- P_{bar} = barometric pressure (in. Hg)
- ppmCO = carbon monoxide concentration (ppm)
- ppmv = Parts per million by volume
- ppmw = Parts per million by weight
- P_s = absolute stack pressure (in. Hg)
- P_{static} = static pressure (in. H_2O)
- P_{std} = standard pressure, 29.92 in. Hg
- Θ = total sampling time (min)
- Q_{aw} = average stack wet flow rate (ascf/min)
- Q_I = Sampling rate for cyclone I to achieve specified D_{50}
- Q_m = estimated orifice flow rate, 0.750 acfm, else Vm/Q from previous run
- Q_s = Sampling rate for cyclone I to achieve specified D_{50}
- $Q_{s(std)}$ = total cyclone flow rate at standard conditions (dscf/min)
- Q_{sd} = dry standard stack flow rate (dscfm)
- Q_{sST} = Dry gas sampling rate through the sampling assembly, dscfm
- Q_{sw} = wet standard stack flow rate (ascfm)
- R_{max} = Nozzle/stack velocity ratio parameter, dimensionless
- R_{min} = Nozzle/stack velocity ratio parameter, dimensionless
- t_1 = Sampling time at point 1, min
- t_m = average gas meter temperature (^oF)

Nomenclature

- t_m = average meter temperature (^oF)
- T_m = Meter box and orifice gas temperature, ^oR
- t_n = Sampling time at point n, min
- t_r = Total projected run time, min
- T_s = Absolute stack gas temperature, ^oR
- T_{std} = standard temperature, 68^oF, 528^oR
- T_u = absolute temperature offset, 460^oR
- V_a = Volume of acetone blank, ml
- V_{aw} = Volume of acetone used in sample recovery wash, ml
- V_b = Volume of aliquot taken for IC analysis, ml
- V_c = Quantity of water captured in impingers and silica gel, ml
- V_f = final impinger volume (ml)
- V_i = initial impinger volume (ml)
- V_{ic} = Volume of impinger contents sample, ml
- V_m = Dry gas meter volume sampled, acf
- $V_{m(std)}$ = standard meter volume (dscf)
- v_{max} = Maximum gas velocity calculated from Equations 18 or 19, ft/sec
- v_{max} = maximum nozzle velocity (ft/sec)
- V_{mf} = final dry gas meter reading (dcf)
- V_{mi} = initial dry gas meter reading (dcf)
- v_{min} = Minimum gas velocity calculated from Method 201A, Equations 16 or 17, ft/sec
- V_{ms} = Dry gas meter volume sampled, corrected to standard conditions, dscf
- v_n = Sample gas velocity in the nozzle, ft/sec
- v_{org} = organics wash volume (ml)
- V_p = Volume of water added during train purge
- v_s = average stack gas velocity (ft/sec)
- v_{sl} = local velocity (ft/sec)
- V_t = total impinger volume (ml) = ;$(V_f$-$V_i)$
- V_t = Volume of NH4OH titrant, ml
- $V_{w(std)}$ = volume of water vapor in gas sample at standard conditions (scf)
- v_x = blank volume (ml)
- W = width of stack (in.)
- $W_{2,3,4}$ = Weight of PM recovered from Containers #2, #3, and #4, mg
- W_a = Weight of blank residue in acetone used to recover samples, mg
- W_f = final impinger weight (g)
- W_i = initial impinger weight (g)
- W_t = total impinger weight (g) = ;$(W_f$-$W_i)$
- w_x = blank weight of solids (g)
- Y = meter calibration factor (a.k.a gamma)
- Z = Ratio between estimated cyclone IV D_{50} values, dimensionless
- γ = Dry gas meter gamma value, dimensionless
- ΔH = Meter box orifice pressure drop, inches W.C.
- ΔH@ = Pressure drop across orifice at flow rate of 0.75 scfm at standard conditions, inches W.C. (Note: Specific to each orifice and meter box.)

Nomenclature

- Δp_1 = Velocity pressure measured at point 1, inches W.C.
- Δp_{avg} = Average velocity pressure, inches W.C.
- Δp_m = Observed velocity pressure using S-type pitot tube in preliminary traverse, inches W.C.
- Δp_{max} = Maximum velocity pressure, inches W.C.
- Δp_{min} = Minimum velocity pressure, inches W.C.
- Δp_n = Velocity pressure measured at point n during the test run, inches W.C.
- Δp_s = Velocity pressure calculated in Method 201a, Equation 25, inches W.C.
- Δp_{s1} = Velocity pressure adjusted for combined cyclone pitot tube, inches W.C.
- Δp_{s2} = Velocity pressure corrected for blockage, inches W.C.
- θ = Total run time, min
- ρ_a = Density of acetone, mg/ml (see label on bottle)
- Σ_n = total number of sampling points

APPENDIX B

UNIT OPERATION PARAMETERS

Florida Power and Light

Air Permit # :	PSD-FL-396
Plant Name or Location:	West County Energy Center
Date:	March 19-20, 2011
Project Number:	bv-10-westcounty.fl-comp#2
Manufacturer & Equipment:	Mitsubishi
Model:	501G
Unit Number:	3B
Test Load:	Base/Base w/DB
Tester(s) / Test Unit(s):	JF/AS/RW/TG/127/206

		RUN					
	UNITS	**1-1**	**1-2**	**1-3**	**2-1**	**2-2**	**2-3**
Start Time	hh:mm:ss	09:32:10	10:45:10	12:05:10	07:52:16	09:13:16	10:26:16
End Time	hh:mm:ss	10:31:40	11:44:40	13:04:40	08:51:46	10:12:46	11:25:46
Bar. Pressure	in. Hg	30.25	30.23	30.25	30.23	30.25	30.27
Amb. Temp.	°F	75	71	81	61	71	80
Rel. Humidity	%	52	58	39	83	76	55
Spec. Humidity	lb water / lb air	0.009505	0.009268	0.008678	0.009375	0.012193	0.011897
Date	mm/dd/yy	03/19/11	03/19/11	03/19/11	03/20/11	03/20/11	03/20/11
Load Designator		Base	Base	Base	Base w/DB	Base w/DB	Base w/DB
Comb. Inlet Pres.	psig	275.9	273.2	269.8	278.4	276.2	272.5
NH_3 Injection Rate	lb/hr	267.3	253.9	244.2	266.8	263.5	248.4
Turbine Fuel Flow	lb/min	1,885	1,858	1,812	1,904	1,889	1,855
Duct Burner Fuel Flow	lb/min	0	0	0	177	178	177
Total Fuel Flow	SCFH	2,633,655	2,595,478	2,530,692	2,907,620	2,887,529	2,839,248
Stack Moisture	% Method 4	9.5	9.4	9.4	10.5	10.0	9.0
Heat Input	MMBtu/hr	2343.3	2309.3	2251.6	2623.5	2605.3	2561.8
Power Output	megawatts	254.6	250.2	245.0	257.8	254.6	249.1

UNIT OPERATION PARAMETERS

Base Load

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
19-Mar-11 09:32:00	277.14	112.64	0.00	257.04	267.25
19-Mar-11 09:33:00	277.17	114.46	0.00	256.48	265.42
19-Mar-11 09:34:00	277.14	112.08	0.00	256.90	265.99
19-Mar-11 09:35:00	277.27	114.72	0.00	257.03	267.13
19-Mar-11 09:36:00	277.00	113.98	0.00	257.23	266.87
19-Mar-11 09:37:00	276.92	113.42	0.00	256.12	267.00
19-Mar-11 09:38:00	276.68	114.18	0.00	256.71	266.45
19-Mar-11 09:39:00	276.74	113.30	0.00	255.53	266.30
19-Mar-11 09:40:00	276.73	114.11	0.00	256.43	267.07
19-Mar-11 09:41:00	276.81	113.53	0.00	256.17	266.75
19-Mar-11 09:42:00	276.85	114.04	0.00	256.52	266.34
19-Mar-11 09:43:00	276.96	112.63	0.00	255.83	265.90
19-Mar-11 09:44:00	276.74	114.10	0.00	256.58	268.51
19-Mar-11 09:45:00	276.60	113.11	0.00	255.71	267.45
19-Mar-11 09:46:00	276.55	112.06	0.00	256.02	266.78
19-Mar-11 09:47:00	276.53	115.24	0.00	255.68	266.93
19-Mar-11 09:48:00	276.45	111.69	0.00	256.22	267.34
19-Mar-11 09:49:00	276.30	115.14	0.00	255.75	267.57
19-Mar-11 09:50:00	276.22	111.97	0.00	254.65	267.28
19-Mar-11 09:51:00	276.36	113.33	0.00	255.52	267.65
19-Mar-11 09:52:00	276.38	113.49	0.00	255.36	267.12
19-Mar-11 09:53:00	276.22	114.64	0.00	255.41	266.93
19-Mar-11 09:54:00	276.03	112.52	0.00	255.18	266.86
19-Mar-11 09:55:00	275.94	114.78	0.00	254.63	265.74
19-Mar-11 09:56:00	275.98	111.80	0.00	254.99	267.28
19-Mar-11 09:57:00	275.90	114.98	0.00	254.92	267.43
19-Mar-11 09:58:00	275.89	113.68	0.00	255.31	267.14
19-Mar-11 09:59:00	276.02	112.06	0.00	254.00	267.38
19-Mar-11 10:00:00	275.95	111.86	0.00	255.13	269.98
19-Mar-11 10:01:00	275.84	115.25	0.00	254.90	269.13
19-Mar-11 10:02:00	275.63	111.26	0.00	254.23	269.16
19-Mar-11 10:03:00	275.44	114.95	0.00	254.44	268.57
19-Mar-11 10:04:00	275.52	112.23	0.00	253.18	268.13
19-Mar-11 10:05:00	275.61	111.44	0.00	254.16	267.00
19-Mar-11 10:06:00	275.51	114.64	0.00	254.52	267.50
19-Mar-11 10:07:00	275.62	112.49	0.00	253.58	267.51
19-Mar-11 10:08:00	275.54	114.84	0.00	254.30	267.95
19-Mar-11 10:09:00	275.54	110.99	0.00	253.58	267.93
19-Mar-11 10:10:00	275.53	114.45	0.00	253.89	268.28
19-Mar-11 10:11:00	275.59	111.16	0.00	253.69	268.12
19-Mar-11 10:12:00	275.40	114.05	0.00	254.25	268.34
19-Mar-11 10:13:00	275.38	112.93	0.00	252.94	268.37
19-Mar-11 10:14:00	275.45	111.19	0.00	253.56	268.05
19-Mar-11 10:15:00	275.55	113.87	0.00	254.32	268.35
19-Mar-11 10:16:00	275.36	112.90	0.00	253.39	268.30
19-Mar-11 10:17:00	275.08	111.49	0.00	253.65	268.17
19-Mar-11 10:18:00	275.04	114.39	0.00	253.01	268.31
19-Mar-11 10:19:00	275.55	111.04	0.00	253.07	269.66
19-Mar-11 10:20:00	275.63	113.33	0.00	254.31	269.04
19-Mar-11 10:21:00	275.46	114.40	0.00	253.50	266.90
19-Mar-11 10:22:00	275.20	110.72	0.00	253.26	269.42
19-Mar-11 10:23:00	275.10	113.19	0.00	253.37	268.99
19-Mar-11 10:24:00	274.87	114.11	0.00	252.58	270.22
19-Mar-11 10:25:00	274.96	110.65	0.00	252.66	270.21
19-Mar-11 10:26:00	275.03	114.39	0.00	253.45	270.20
19-Mar-11 10:27:00	275.13	110.21	0.00	252.59	270.33
19-Mar-11 10:28:00	274.99	113.36	0.00	253.66	269.86
19-Mar-11 10:29:00	274.83	112.05	0.00	252.36	269.30
19-Mar-11 10:30:00	274.67	112.47	0.00	252.80	278.29
19-Mar-11 10:31:00	274.92	113.43	0.00	252.44	223.92
Average	275.91	113.12	0.00	254.65	267.29

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
19-Mar-11 10:45:00	274.51	110.47	0.00	251.93	244.90
19-Mar-11 10:46:00	274.39	112.98	0.00	252.53	244.35
19-Mar-11 10:47:00	274.45	113.69	0.00	252.24	244.46
19-Mar-11 10:48:00	274.57	110.57	0.00	251.62	243.78
19-Mar-11 10:49:00	274.70	110.37	0.00	252.34	242.48
19-Mar-11 10:50:00	274.68	112.76	0.00	252.93	242.84
19-Mar-11 10:51:00	274.51	111.17	0.00	252.05	246.11
19-Mar-11 10:52:00	274.29	111.60	0.00	252.72	248.42
19-Mar-11 10:53:00	274.17	113.69	0.00	251.96	252.30
19-Mar-11 10:54:00	274.12	109.98	0.00	251.12	248.30
19-Mar-11 10:55:00	274.31	110.60	0.00	252.31	252.24
19-Mar-11 10:56:00	274.43	114.37	0.00	252.45	256.91
19-Mar-11 10:57:00	274.20	113.85	0.00	251.94	282.46
19-Mar-11 10:58:00	274.41	109.96	0.00	251.26	301.71
19-Mar-11 10:59:00	274.32	110.89	0.00	252.21	302.20
19-Mar-11 11:00:00	274.38	114.01	0.00	252.57	284.55
19-Mar-11 11:01:00	274.11	113.99	0.00	251.82	272.18
19-Mar-11 11:02:00	273.84	110.01	0.00	250.94	259.79
19-Mar-11 11:03:00	273.63	110.38	0.00	251.43	257.17
19-Mar-11 11:04:00	273.60	112.91	0.00	251.33	281.11
19-Mar-11 11:05:00	272.76	113.61	0.00	250.44	259.66
19-Mar-11 11:06:00	272.38	112.34	0.00	249.09	272.30
19-Mar-11 11:07:00	272.63	109.32	0.00	248.58	257.73
19-Mar-11 11:08:00	272.81	109.83	0.00	250.21	236.29
19-Mar-11 11:09:00	273.07	112.66	0.00	251.32	235.58
19-Mar-11 11:10:00	272.43	112.09	0.00	249.27	298.52
19-Mar-11 11:11:00	271.69	110.25	0.00	248.34	249.74
19-Mar-11 11:12:00	273.10	108.98	0.00	248.69	229.27
19-Mar-11 11:13:00	273.34	111.63	0.00	250.90	222.78
19-Mar-11 11:14:00	273.59	113.78	0.00	251.59	233.85
19-Mar-11 11:15:00	273.02	111.82	0.00	250.01	241.49
19-Mar-11 11:16:00	272.55	110.71	0.00	248.75	259.84
19-Mar-11 11:17:00	272.66	110.54	0.00	248.96	246.48
19-Mar-11 11:18:00	273.23	109.36	0.00	249.49	254.18
19-Mar-11 11:19:00	273.32	111.53	0.00	251.14	244.51
19-Mar-11 11:20:00	272.99	111.99	0.00	250.05	252.54
19-Mar-11 11:21:00	271.69	113.41	0.00	249.88	257.94
19-Mar-11 11:22:00	273.35	112.67	0.00	249.04	248.30
19-Mar-11 11:23:00	273.41	111.12	0.00	250.18	260.14
19-Mar-11 11:24:00	273.07	109.75	0.00	250.63	255.03
19-Mar-11 11:25:00	271.69	109.25	0.00	248.90	261.96
19-Mar-11 11:26:00	271.74	108.58	0.00	246.63	294.27
19-Mar-11 11:27:00	271.93	112.47	0.00	248.58	281.85
19-Mar-11 11:28:00	272.86	112.98	0.00	249.73	241.52
19-Mar-11 11:29:00	272.47	113.31	0.00	250.19	236.97
19-Mar-11 11:30:00	272.29	111.66	0.00	249.59	240.14
19-Mar-11 11:31:00	272.10	110.81	0.00	247.85	252.91
19-Mar-11 11:32:00	272.34	113.19	0.00	249.09	237.82
19-Mar-11 11:33:00	272.92	112.26	0.00	249.56	237.29
19-Mar-11 11:34:00	272.71	109.33	0.00	249.62	240.95
19-Mar-11 11:35:00	271.83	112.90	0.00	248.20	245.75
19-Mar-11 11:36:00	272.36	108.02	0.00	247.43	251.95
19-Mar-11 11:37:00	272.47	113.02	0.00	249.25	237.38
19-Mar-11 11:38:00	272.85	111.21	0.00	249.50	236.55
19-Mar-11 11:39:00	272.85	108.95	0.00	249.76	248.35
19-Mar-11 11:40:00	272.58	112.88	0.00	248.89	253.74
19-Mar-11 11:41:00	272.12	108.49	0.00	248.83	257.20
19-Mar-11 11:42:00	272.08	113.33	0.00	248.64	252.62
19-Mar-11 11:43:00	272.39	108.62	0.00	248.18	251.92
19-Mar-11 11:44:00	272.48	112.15	0.00	249.90	248.16
Average	273.16	111.48	0.00	250.24	253.90

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
19-Mar-11 12:05:00	271.53	102.46	0.00	247.40	259.41
19-Mar-11 12:06:00	271.66	114.40	0.00	247.31	264.02
19-Mar-11 12:07:00	272.25	112.49	0.00	248.39	247.04
19-Mar-11 12:08:00	272.30	104.73	0.00	248.85	251.08
19-Mar-11 12:09:00	271.97	115.16	0.00	248.30	257.70
19-Mar-11 12:10:00	271.30	110.86	0.00	247.93	252.84
19-Mar-11 12:11:00	271.15	104.12	0.00	246.86	255.68
19-Mar-11 12:12:00	270.47	113.38	0.00	246.08	253.91
19-Mar-11 12:13:00	270.42	112.69	0.00	245.12	260.67
19-Mar-11 12:14:00	270.74	102.56	0.00	246.02	225.63
19-Mar-11 12:15:00	270.91	111.72	0.00	247.06	234.85
19-Mar-11 12:16:00	271.57	117.52	0.00	247.56	240.61
19-Mar-11 12:17:00	270.77	109.32	0.00	247.78	245.13
19-Mar-11 12:18:00	270.69	104.25	0.00	244.88	259.64
19-Mar-11 12:19:00	270.24	112.51	0.00	246.50	251.77
19-Mar-11 12:20:00	270.83	116.93	0.00	246.80	245.91
19-Mar-11 12:21:00	271.41	108.99	0.00	246.59	246.42
19-Mar-11 12:22:00	271.41	105.20	0.00	247.61	248.77
19-Mar-11 12:23:00	271.31	104.66	0.00	247.03	253.84
19-Mar-11 12:24:00	271.35	110.69	0.00	247.02	260.74
19-Mar-11 12:25:00	271.66	118.45	0.00	247.84	266.69
19-Mar-11 12:26:00	271.20	114.80	0.00	247.81	265.52
19-Mar-11 12:27:00	269.03	111.73	0.00	246.25	261.62
19-Mar-11 12:28:00	269.26	105.35	0.00	243.38	266.40
19-Mar-11 12:29:00	269.19	102.96	0.00	243.88	227.43
19-Mar-11 12:30:00	269.04	106.38	0.00	244.67	227.07
19-Mar-11 12:31:00	267.70	114.02	0.00	243.76	236.13
19-Mar-11 12:32:00	269.02	113.11	0.00	241.73	231.68
19-Mar-11 12:33:00	268.09	103.56	0.00	241.87	218.61
19-Mar-11 12:34:00	268.09	105.56	0.00	242.90	212.50
19-Mar-11 12:35:00	269.94	114.87	0.00	244.63	227.24
19-Mar-11 12:36:00	269.38	113.38	0.00	244.77	244.72
19-Mar-11 12:37:00	269.27	105.93	0.00	245.13	233.76
19-Mar-11 12:38:00	270.63	103.11	0.00	245.41	242.11
19-Mar-11 12:39:00	271.10	112.56	0.00	247.24	237.33
19-Mar-11 12:40:00	268.21	116.26	0.00	244.88	248.99
19-Mar-11 12:41:00	267.76	105.56	0.00	242.41	259.67
19-Mar-11 12:42:00	267.60	104.26	0.00	242.10	233.70
19-Mar-11 12:43:00	267.54	114.94	0.00	242.80	222.16
19-Mar-11 12:44:00	267.36	111.43	0.00	243.00	215.05
19-Mar-11 12:45:00	267.91	101.23	0.00	241.63	210.00
19-Mar-11 12:46:00	268.78	106.68	0.00	243.21	211.18
19-Mar-11 12:47:00	268.54	115.56	0.00	244.31	209.43
19-Mar-11 12:48:00	269.63	115.92	0.00	245.38	213.73
19-Mar-11 12:49:00	271.13	113.28	0.00	246.21	225.60
19-Mar-11 12:50:00	271.29	110.61	0.00	247.15	231.03
19-Mar-11 12:51:00	271.05	109.08	0.00	246.66	249.48
19-Mar-11 12:52:00	270.46	106.97	0.00	245.64	260.65
19-Mar-11 12:53:00	269.69	105.62	0.00	245.76	255.09
19-Mar-11 12:54:00	269.85	104.31	0.00	244.16	272.14
19-Mar-11 12:55:00	270.27	105.79	0.00	245.34	246.92
19-Mar-11 12:56:00	269.13	104.32	0.00	244.35	258.06
19-Mar-11 12:57:00	266.90	105.35	0.00	242.55	280.80
19-Mar-11 12:58:00	265.91	103.79	0.00	242.03	249.57
19-Mar-11 12:59:00	268.18	101.67	0.00	239.02	266.96
19-Mar-11 13:00:00	268.78	102.61	0.00	240.24	229.56
19-Mar-11 13:01:00	269.53	103.53	0.00	241.42	229.45
19-Mar-11 13:02:00	269.42	104.69	0.00	242.29	247.36
19-Mar-11 13:03:00	268.59	104.25	0.00	242.48	254.65
19-Mar-11 13:04:00	269.47	103.88	0.00	243.08	254.31
Average	269.83	108.70	0.00	245.01	244.17

UNIT OPERATION PARAMETERS

Base Load with Duct Burners

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
20-Mar-11 07:52:00	279.07	112.81	10.59	258.51	271.10
20-Mar-11 07:53:00	278.99	116.43	10.59	258.70	273.58
20-Mar-11 07:54:00	278.81	112.85	10.59	258.73	273.90
20-Mar-11 07:55:00	278.59	114.78	10.59	258.31	273.12
20-Mar-11 07:56:00	278.77	114.41	10.59	257.81	271.46
20-Mar-11 07:57:00	278.84	113.33	10.59	258.66	273.20
20-Mar-11 07:58:00	278.53	116.58	10.59	258.44	268.01
20-Mar-11 07:59:00	278.84	112.80	10.60	257.85	264.90
20-Mar-11 08:00:00	278.87	114.63	10.60	258.78	260.70
20-Mar-11 08:01:00	278.77	114.31	10.60	258.31	261.08
20-Mar-11 08:02:00	278.64	113.16	10.60	258.47	261.52
20-Mar-11 08:03:00	278.51	116.82	10.60	258.06	266.84
20-Mar-11 08:04:00	278.51	112.93	10.60	258.09	262.70
20-Mar-11 08:05:00	278.50	116.07	10.60	258.39	262.34
20-Mar-11 08:06:00	278.70	112.78	10.61	258.15	295.68
20-Mar-11 08:07:00	278.65	116.70	10.61	258.32	267.13
20-Mar-11 08:08:00	278.29	112.49	10.61	257.62	262.90
20-Mar-11 08:09:00	278.47	116.12	10.61	257.96	261.15
20-Mar-11 08:10:00	278.70	112.40	10.61	257.85	259.41
20-Mar-11 08:11:00	278.74	116.85	10.61	258.49	259.32
20-Mar-11 08:12:00	278.77	113.00	10.61	257.62	267.97
20-Mar-11 08:13:00	278.96	114.80	10.62	258.69	262.12
20-Mar-11 08:14:00	279.02	116.54	10.62	258.58	260.54
20-Mar-11 08:15:00	279.02	113.40	10.62	258.86	267.10
20-Mar-11 08:16:00	278.82	116.81	10.62	258.40	271.24
20-Mar-11 08:17:00	278.73	114.04	10.62	257.53	272.59
20-Mar-11 08:18:00	278.71	114.97	10.62	258.96	267.69
20-Mar-11 08:19:00	278.71	115.51	10.62	257.63	266.51
20-Mar-11 08:20:00	278.69	112.74	10.63	258.51	278.59
20-Mar-11 08:21:00	278.61	116.01	10.63	258.52	272.68
20-Mar-11 08:22:00	278.57	113.22	10.63	257.62	269.36
20-Mar-11 08:23:00	278.67	112.68	10.63	258.00	275.06
20-Mar-11 08:24:00	278.70	116.12	10.63	258.41	310.10
20-Mar-11 08:25:00	278.57	112.28	10.63	257.91	297.42
20-Mar-11 08:26:00	278.64	114.69	10.63	258.64	290.28
20-Mar-11 08:27:00	278.85	113.53	10.64	257.79	269.83
20-Mar-11 08:28:00	278.86	114.33	10.64	259.06	311.07
20-Mar-11 08:29:00	278.78	115.36	10.64	258.39	299.88
20-Mar-11 08:30:00	278.60	113.47	10.64	258.63	277.10
20-Mar-11 08:31:00	277.96	114.51	10.64	257.76	261.64
20-Mar-11 08:32:00	277.92	114.15	10.64	257.65	262.23
20-Mar-11 08:33:00	278.17	112.73	10.64	256.88	256.72
20-Mar-11 08:34:00	278.25	114.86	10.65	258.35	252.36
20-Mar-11 08:35:00	278.15	114.24	10.65	257.43	267.34
20-Mar-11 08:36:00	278.08	114.73	10.65	257.83	257.61
20-Mar-11 08:37:00	278.08	114.28	10.65	257.01	282.93
20-Mar-11 08:38:00	278.18	114.52	10.65	257.74	263.90
20-Mar-11 08:39:00	277.66	112.09	10.65	257.13	256.70
20-Mar-11 08:40:00	277.56	115.87	10.65	257.21	256.70
20-Mar-11 08:41:00	277.45	112.30	10.65	256.58	252.89
20-Mar-11 08:42:00	276.81	114.97	10.65	256.25	246.57
20-Mar-11 08:43:00	276.89	113.39	10.65	255.50	247.63
20-Mar-11 08:44:00	276.56	111.52	10.65	255.48	246.54
20-Mar-11 08:45:00	277.19	115.54	10.65	256.41	238.84
20-Mar-11 08:46:00	277.09	111.91	10.65	256.16	249.42
20-Mar-11 08:47:00	277.58	113.94	10.66	256.25	246.54
20-Mar-11 08:48:00	277.75	115.16	10.66	257.15	251.33
20-Mar-11 08:49:00	278.11	112.54	10.66	257.28	254.09
20-Mar-11 08:50:00	278.15	116.72	10.66	257.41	256.79
20-Mar-11 08:51:00	277.92	113.15	10.66	257.71	260.11
Average	278.36	114.26	10.63	257.84	266.77

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
20-Mar-11 09:13:00	277.59	112.85	10.67	256.98	264.31
20-Mar-11 09:14:00	277.59	116.12	10.67	256.56	280.64
20-Mar-11 09:15:00	277.49	112.15	10.67	256.51	300.21
20-Mar-11 09:16:00	277.67	112.66	10.68	257.19	261.64
20-Mar-11 09:17:00	277.81	113.57	10.68	256.23	321.81
20-Mar-11 09:18:00	277.82	111.94	10.68	256.70	312.72
20-Mar-11 09:19:00	277.67	113.68	10.68	257.32	270.60
20-Mar-11 09:20:00	277.39	113.22	10.68	257.32	297.39
20-Mar-11 09:21:00	277.31	115.64	10.68	256.28	275.18
20-Mar-11 09:22:00	277.30	115.66	10.68	255.95	254.97
20-Mar-11 09:23:00	277.37	114.97	10.68	255.80	248.66
20-Mar-11 09:24:00	277.21	115.35	10.68	256.17	248.30
20-Mar-11 09:25:00	277.08	114.03	10.68	256.07	250.27
20-Mar-11 09:26:00	277.02	111.38	10.68	255.38	248.07
20-Mar-11 09:27:00	276.97	114.56	10.68	256.19	247.75
20-Mar-11 09:28:00	277.05	113.48	10.68	255.26	257.94
20-Mar-11 09:29:00	277.15	112.30	10.68	255.59	260.20
20-Mar-11 09:30:00	277.03	111.63	10.69	255.74	251.61
20-Mar-11 09:31:00	276.94	113.25	10.69	256.50	280.23
20-Mar-11 09:32:00	276.93	111.42	10.69	256.00	252.81
20-Mar-11 09:33:00	276.91	114.36	10.69	255.90	249.27
20-Mar-11 09:34:00	276.94	115.51	10.69	255.96	246.85
20-Mar-11 09:35:00	276.92	116.15	10.69	255.41	250.71
20-Mar-11 09:36:00	276.72	115.98	10.69	255.17	254.12
20-Mar-11 09:37:00	276.66	115.54	10.69	255.16	250.25
20-Mar-11 09:38:00	276.67	113.63	10.68	255.03	256.67
20-Mar-11 09:39:00	276.64	114.61	10.68	254.93	268.67
20-Mar-11 09:40:00	276.57	115.31	10.68	255.16	258.00
20-Mar-11 09:41:00	276.49	115.42	10.68	255.29	256.09
20-Mar-11 09:42:00	276.36	114.85	10.68	255.00	258.00
20-Mar-11 09:43:00	276.47	114.67	10.68	255.60	256.67
20-Mar-11 09:44:00	276.23	110.90	10.68	255.05	255.29
20-Mar-11 09:45:00	276.08	111.88	10.68	254.69	260.76
20-Mar-11 09:46:00	276.39	112.34	10.68	255.04	282.82
20-Mar-11 09:47:00	276.45	111.89	10.67	254.99	269.72
20-Mar-11 09:48:00	276.56	114.59	10.67	254.91	266.98
20-Mar-11 09:49:00	276.01	116.23	10.67	254.77	258.36
20-Mar-11 09:50:00	275.87	115.26	10.67	253.79	258.30
20-Mar-11 09:51:00	275.95	114.84	10.67	253.92	252.33
20-Mar-11 09:52:00	275.57	113.48	10.67	254.18	250.95
20-Mar-11 09:53:00	275.47	112.42	10.67	253.15	256.32
20-Mar-11 09:54:00	275.00	110.33	10.67	253.33	256.92
20-Mar-11 09:55:00	275.09	110.96	10.67	252.60	255.73
20-Mar-11 09:56:00	275.07	111.07	10.66	253.38	259.79
20-Mar-11 09:57:00	275.52	110.82	10.66	253.90	250.50
20-Mar-11 09:58:00	275.21	112.69	10.66	253.85	255.51
20-Mar-11 09:59:00	274.82	113.75	10.66	253.16	257.21
20-Mar-11 10:00:00	274.25	114.65	10.66	252.79	255.47
20-Mar-11 10:01:00	274.35	110.69	10.66	251.75	255.91
20-Mar-11 10:02:00	274.39	111.99	10.66	251.67	256.26
20-Mar-11 10:03:00	274.71	110.53	10.66	252.87	248.04
20-Mar-11 10:04:00	274.30	110.66	10.65	252.36	256.10
20-Mar-11 10:05:00	274.25	114.25	10.65	251.81	263.90
20-Mar-11 10:06:00	273.88	110.53	10.65	251.01	293.30
20-Mar-11 10:07:00	273.98	114.02	10.65	251.47	253.77
20-Mar-11 10:08:00	274.60	113.22	10.65	251.43	243.69
20-Mar-11 10:09:00	274.80	110.98	10.65	252.31	275.44
20-Mar-11 10:10:00	275.10	111.18	10.65	253.13	292.48
20-Mar-11 10:11:00	275.03	114.96	10.65	253.09	313.28
20-Mar-11 10:12:00	274.65	114.37	10.65	251.98	262.62
Average	276.16	113.36	10.67	254.61	263.47

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT B PPH
20-Mar-11 10:26:00	274.03	112.20	10.63	250.95	238.72
20-Mar-11 10:27:00	274.21	113.46	10.63	251.12	238.08
20-Mar-11 10:28:00	274.11	111.94	10.63	251.21	242.43
20-Mar-11 10:29:00	273.75	113.88	10.63	251.14	244.34
20-Mar-11 10:30:00	273.49	111.88	10.62	250.40	249.07
20-Mar-11 10:31:00	273.50	112.46	10.62	250.52	244.51
20-Mar-11 10:32:00	273.42	112.01	10.62	250.51	242.55
20-Mar-11 10:33:00	273.24	111.08	10.62	250.56	247.00
20-Mar-11 10:34:00	273.59	109.91	10.62	250.17	244.95
20-Mar-11 10:35:00	273.95	111.36	10.62	251.27	248.66
20-Mar-11 10:36:00	273.76	111.69	10.62	251.33	286.47
20-Mar-11 10:37:00	273.64	109.85	10.62	250.65	301.88
20-Mar-11 10:38:00	273.53	110.75	10.62	250.45	252.18
20-Mar-11 10:39:00	273.40	112.61	10.62	250.74	240.89
20-Mar-11 10:40:00	273.61	110.18	10.62	250.23	246.95
20-Mar-11 10:41:00	273.39	112.58	10.62	251.24	241.28
20-Mar-11 10:42:00	273.03	111.50	10.62	250.01	244.60
20-Mar-11 10:43:00	272.86	111.47	10.62	249.40	250.45
20-Mar-11 10:44:00	273.14	112.02	10.62	250.13	252.44
20-Mar-11 10:45:00	273.45	113.02	10.62	250.45	248.86
20-Mar-11 10:46:00	273.64	110.45	10.62	250.41	244.93
20-Mar-11 10:47:00	273.73	110.84	10.62	250.77	247.75
20-Mar-11 10:48:00	273.51	112.28	10.62	250.88	251.18
20-Mar-11 10:49:00	273.26	110.36	10.62	250.05	251.42
20-Mar-11 10:50:00	273.14	113.86	10.62	250.52	247.86
20-Mar-11 10:51:00	273.27	112.25	10.62	249.29	247.95
20-Mar-11 10:52:00	272.97	112.39	10.62	250.03	268.38
20-Mar-11 10:53:00	273.43	113.66	10.62	250.14	263.93
20-Mar-11 10:54:00	273.10	113.37	10.62	250.59	266.49
20-Mar-11 10:55:00	273.13	111.77	10.62	249.44	245.37
20-Mar-11 10:56:00	273.04	111.69	10.62	249.66	269.16
20-Mar-11 10:57:00	273.35	110.87	10.62	250.08	247.25
20-Mar-11 10:58:00	273.18	111.63	10.62	250.45	249.57
20-Mar-11 10:59:00	272.70	110.50	10.63	249.29	246.04
20-Mar-11 11:00:00	272.83	110.62	10.63	249.60	243.54
20-Mar-11 11:01:00	272.88	111.51	10.63	250.18	242.37
20-Mar-11 11:02:00	272.87	111.67	10.63	250.27	261.84
20-Mar-11 11:03:00	272.83	113.44	10.63	249.40	269.60
20-Mar-11 11:04:00	272.84	109.16	10.63	249.66	250.18
20-Mar-11 11:05:00	273.00	112.61	10.63	249.58	246.82
20-Mar-11 11:06:00	272.67	109.61	10.63	249.88	249.90
20-Mar-11 11:07:00	271.92	109.94	10.63	248.11	266.07
20-Mar-11 11:08:00	272.52	111.63	10.63	248.13	244.90
20-Mar-11 11:09:00	272.58	111.45	10.63	249.33	244.19
20-Mar-11 11:10:00	271.74	112.40	10.63	248.59	249.65
20-Mar-11 11:11:00	272.20	111.14	10.63	247.54	256.85
20-Mar-11 11:12:00	272.28	110.12	10.63	248.77	256.53
20-Mar-11 11:13:00	271.79	110.88	10.63	249.21	274.85
20-Mar-11 11:14:00	270.26	109.83	10.63	247.43	277.79
20-Mar-11 11:15:00	270.08	112.41	10.63	245.52	252.50
20-Mar-11 11:16:00	271.42	110.46	10.63	246.96	233.91
20-Mar-11 11:17:00	269.41	112.14	10.63	246.54	223.66
20-Mar-11 11:18:00	270.26	108.73	10.63	244.92	233.85
20-Mar-11 11:19:00	269.94	108.59	10.63	246.45	222.95
20-Mar-11 11:20:00	270.20	111.41	10.63	246.15	227.68
20-Mar-11 11:21:00	269.05	110.81	10.63	244.93	232.18
20-Mar-11 11:22:00	268.94	110.29	10.63	243.46	229.77
20-Mar-11 11:23:00	269.16	108.37	10.63	243.70	229.09
20-Mar-11 11:24:00	269.29	107.84	10.63	244.41	211.90
20-Mar-11 11:25:00	268.92	110.95	10.63	244.62	218.28
Average	272.47	111.33	10.63	249.12	248.41

APPENDIX C

CALIBRATION GAS CERTIFICATIONS

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

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

P.O. No.: 11010210
Document # : 40522095-002

Customer

AIR HYGIENE INTERNATIONAL

MIKE SCOTT
5634 S 122ND E AVE
TULSA OK 74146
US

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: AAL191 **Certification Date:** 15Feb2011 **Exp. Date:** 16Aug2011
Cylinder Pressure*:** 1950 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	4.89	PPM	+/- 1%	Direct NIST and VSL
CARBON MONOXIDE	4.92	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	4.93	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	15Aug2013	KAL003004	19.83	PPM	NITRIC OXIDE
NTRM 2635	05May2016	KAL003163	25.21	PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
ECO PHYSICS/CLD 84M/84M0359	07Feb2011	CHEMI
SIEMENS I/ULTRAMAT 6E/N1-VN-0545	25Jan2011	NDIR

ANALYZER READINGS

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

First Triad Analysis	Second Triad Analysis	Calibration Curve
NITRIC OXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=19.83000 T1=4.85900	Z1=0.00000 R1=19.72000 T1=4.83700	r=0.9999
R2=19.84000 Z2=0.00000 T2=4.86000	R2=19.73000 Z2=0.00000 T2=4.83400	Constants: A=0.036017895
Z3=0.00000 T3=4.85700 R3=19.84000	Z3=0.00000 T3=4.83100 R3=19.73000	B=0.999152579 C=0
Avg. Concentration: 4.889 PPM	Avg. Concentration: 4.891 PPM	D=0 E=0
CARBON MONOXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=25.40000 T1=4.60000	Z1=0.00000 R1=25.21000 T1=4.61000	r=0.9999
R2=25.40000 Z2=0.00000 T2=4.60000	R2=25.21000 Z2=0.00000 T2=4.61000	Constants: A=0.02020944
Z3=0.00000 T3=4.60000 R3=25.40000	Z3=0.00000 T3=4.61000 R3=25.21000	B=1.096985091 C=-0.0077427
Avg. Concentration: 4.898 PPM	Avg. Concentration: 4.944 PPM	D=0.000148781 E=0

Special Notes: AH070

APPROVED BY: HILARY THATCHER

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: 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
	02Oct2010	KAL003166	25.21 PPM	CARBON MONOXIDE
NTRM 2629	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	Second Triad Analysis	Calibration Curve
CARBON MONOXIDE		
Date: 14Apr2010 Response Unit:PPM	Date: 21Apr2010 Response Unit: PPM	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=-0.05307 R1=25.30663 T1=12.10338	Z1=-0.06291 R1=25.26965 T1=12.17129	r=9.99986E-1
R2=25.31267 Z2=-0.05306 T2=12.12388	R2=25.30621 Z2=-0.02751 T2=12.19590	Constants: A=0.00000E+0
Z3=-0.03830 T3=12.14423 R3=25.34334	Z3=0.02191 T3=12.19939 R3=25.34779	B=8.81389E-1 C=5.84000E-4
Avg. Concentration: 12.09 PPM	Avg. Concentration: 12.15 PPM	D=1.00000E-6 E=0.00000E+0
NITRIC OXIDE		
Date: 14Apr2010 Response Unit:MV	Date: 21Apr2010 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=20.33000 T1=12.05000	Z1=0.00000 R1=20.29000 T1=11.96000	r=0.999989
R2=20.35000 Z2=0.00000 T2=12.05000	R2=20.28000 Z2=0.00000 T2=11.96000	Constants: A=0.052499
Z3=0.00000 T3=12.05000 R3=20.34000	Z3=0.00000 T3=11.96000 R3=20.29000	B=0.998591 C=0.000000
Avg. Concentration: 12.11 PPM	Avg. Concentration: 12.04 PPM	D=0.000000 E=0.000000

Special Notes: AH072 Lot Number: 0586916005

APPROVED BY: ______________________
Rob. McCrandall

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

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

P.O. No.: ALAS-55510
Project No.: 05-86523-002

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: 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=-0.0004667
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=0.9999996852
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

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

P.O. No.: ALAS-56936
Project No.: 05-88735-006

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=-0.00585731
B=0.131066552 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
8=0.999830474 C=0
D=0 E=0

Special Notes: PART# AH095

APPROVED BY: ____________________
JEFF CROTEAU

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		Customer
	P.O. No.: 9092010	AIR LIQUIDE AMERICA L.P.
AIR LIQUIDE AMERICA SPECIALTY GASES LLC	Project No.: 05-80747-007	
1290 COMBERMERE STREET		801 W NORTH CARRIER PKWY
TROY, MI 48083		GRAND PRAIRIE TX 75050-1003

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: AAL687 **Certification Date:** 12Oct2009 **Exp. Date:** 11Oct2012

Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
METHANE	3.10	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 1659 10	02Oct2013	ALM058053	9.920 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/7506	17Sep2009	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: 12Oct2009	Response Unit:AREA	
Z1=0.00000	R1=91476.00	T1=28119.00
R2=91405.00	Z2=0.00000	T2=28109.00
Z3=0.00000	T3=28107.00	R3=91478.00
Avg. Concentration:	3.100	PPM

Concentration=A+Bx+Cx2+Dx3+Ex4

r=0.99999124

Constants:	A=0.04550378
B=0.000107911	C=0
D=0	E=0

APPROVED BY:

ROBERT LESNIAK

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

P.O. Number: 9032901
Item Number: SGZCAH002

Assay Date: 24-Apr-2009

Expiration Date: 24-Apr-2012

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

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			
Analyzer Information			*Trial 1*	*Trial 2*	*Trial 3*	*Units*
Analyzer Type:	Gas Chromatograph	Zero	0.000	0.000	0.000	Area
Manufacturer:	Hewlett Packard	Reference	97.22	97.24	97.24	Area
Model Number:	G1540A	Candidate	45.95	45.92	46.03	Area
Serial Number:	US00003390/Meth	Result	4.755	4.751	4.762	ppm
MPR Last Calibrated:	23-Apr-2009	Evaluation	Valid	Valid	Valid	
Analytical Principle:	FID & TCD			Mean Analytical Result:	4.756	ppm

Analyst: ______________________ Eric Barron

Approved by: ______________________ Jason Unger

AIR LIQUIDE AMERICA, L.P. Region Office • 8832 Dice Road, Santa Fe Springs, CA 90670-2516
Phone: (562) 945-1383 • Fax: (562) 693-1156

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		**Customer**
	P.O. No.: 9081310	AIR LIQUIDE AMERICA L.P.
AIR LIQUIDE AMERICA SPECIALTY GASES LLC	Project No.: 05-79607-014	AIR HYGIENE
1290 COMBERMERE STREET		1319 NORTH PEORIA AVE
TROY, MI 48083		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+Cx2+Dx3+Ex4

r=0.999995113

Constants:	A=0.11264489
B=0.000109556	C=0
D=0	E=0

APPROVED BY:
ROBERT LESNIAK

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott™

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

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
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

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

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
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. NO_2 to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO_2 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:	March 19-20, 2011
Company:	Florida Power and Light
Location:	Loxahatchee, Florida
Techs:	PS/SB

Sample System Leak Check

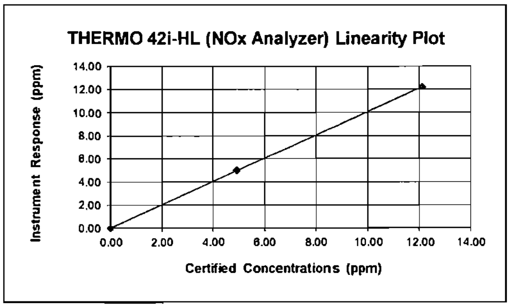
Date	Sample System	Leak Rate (l/min)
March 19-20, 2011	1	0

Calibration Date: March 19, 2011
Client: Florida Power and Light

NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)

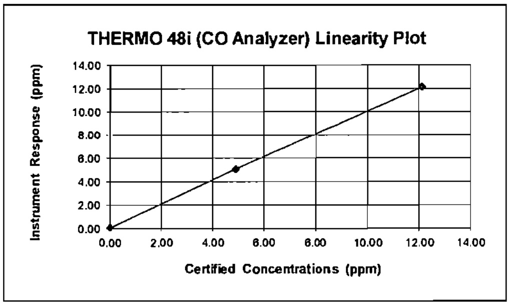
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.03	0.25	0.03	YES (%)
4.93	5.00	0.58	0.07	YES (%)
12.10	12.22	0.99	0.12	YES (%)
Linearity = 0.993				


THERMO 42i-HL (NOx Analyzer) Linearity Plot

CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)

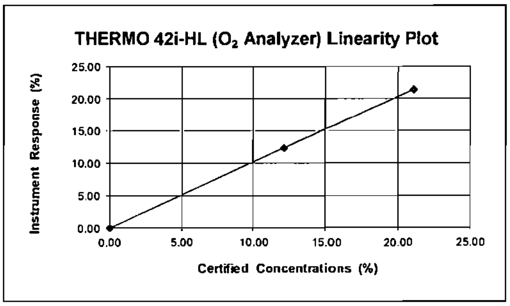
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.08	0.66	0.08	YES (%)
4.92	5.10	1.49	0.18	YES (%)
12.10	12.11	0.08	0.01	YES (%)
Linearity = 1.007				


THERMO 48i (CO Analyzer) Linearity Plot

O_2 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	12.34	1.14	0.24	YES (%)
21.10	21.46	1.71	0.36	YES (%)
Linearity = 0.985				

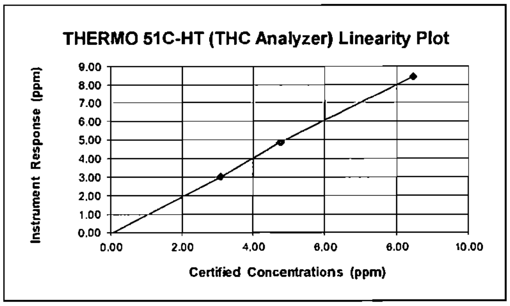

THERMO 42i-HL (O_2 Analyzer) Linearity Plot

THC Range (ppm) = 10.5

THERMO 51C-HT (THC Analyzer)

Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2,5%)[1]
0.00	-0.03	-0.29	N/A	YES
3.10	3.02	-1.73	3.07	YES
4.76	4.88	3.03	4.74	YES
8.46	8.44	-0.19	N/A	YES
Linearity = 0.996				

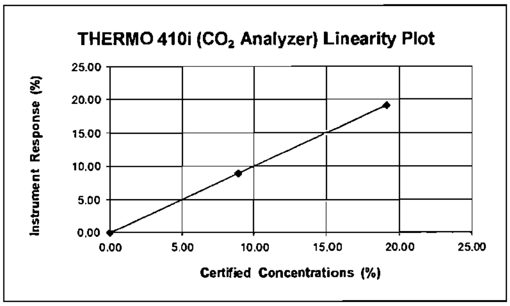
[1]-zero/high based on 2% of span,low/mid based on 5% of concentration


THERMO 51C-HT (THC Analyzer) Linearity Plot

CO_2 Span (%) = 19.10

THERMO 410i (CO_2 Analyzer)

Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.04	0.21	0.04	YES (%)
8.91	8.97	0.31	0.06	YES (%)
19.10	19.14	0.21	0.04	YES (%)
Linearity = 1.000				


THERMO 410i (CO_2 Analyzer) Linearity Plot

NOx Converter Efficiency

Date: March 19, 2011
Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**1.95**
	Analyzer Reading, NOx Channel, ppmvd	**47.95**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**46.00**
	Converter Efficiency, %	**95.44**

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.

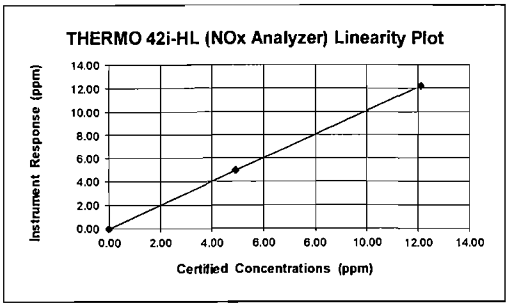
$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V} \right) \times 100 \qquad \text{Eq. 7E-7} = \frac{46.00 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 95.44\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/19/11 07:19:40	1350	12.73	4.42
03/19/11 07:20:10	1380	39.46	2.55
03/19/11 07:20:40	1410	46.43	2.20
03/19/11 07:21:10	1440	47.34	2.09
03/19/11 07:21:40	1470	47.72	2.00
03/19/11 07:22:10	***1500***	***47.95***	***1.95***
03/19/11 07:22:40	1530	45.46	1.79
03/19/11 07:23:10	1560	15.84	0.54

Calibration Date: March 20, 2011
Client: Florida Power and Light

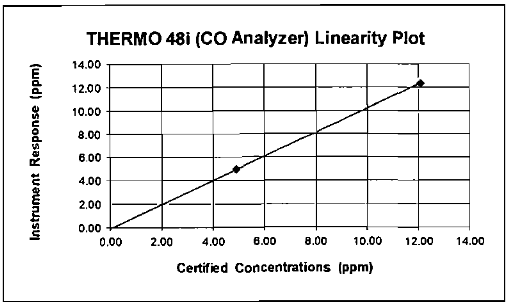
NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.00	0.00	0.00	YES (%)
4.93	4.98	0.41	0.05	YES (%)
12.10	12.21	0.91	0.11	YES (%)
Linearity = 0.991				


THERMO 42i-HL (NOx Analyzer) Linearity Plot

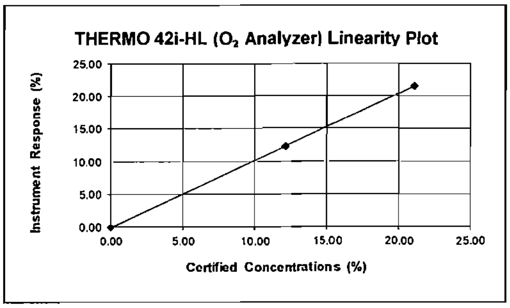
CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	-0.08	-0.66	0.08	YES (%)
4.92	4.99	0.58	0.07	YES (%)
12.10	12.36	2.15	0.26	YES (abs)
Linearity = 0.973				


THERMO 48i (CO Analyzer) Linearity Plot

O2 Span (%) = 21.10

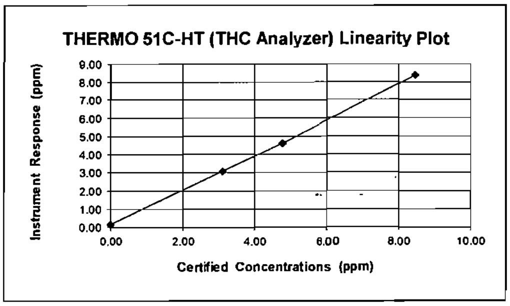
THERMO 42i-HL (O_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.01	0.05	0.01	YES (%)
12.10	12.30	0.95	0.20	YES (%)
21.10	21.52	1.99	0.42	YES (%)
Linearity = 0.981				


THERMO 42i-HL (O_2 Analyzer) Linearity Plot

THC Range (ppm) = 10.5

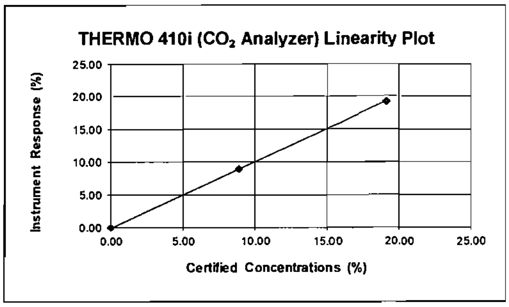
THERMO 51C-HT (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2,5%)[1]
0.00	0.18	1.71	N/A	YES
3.10	3.09	-3.17	3.19	YES
4.76	4.62	-3.77	4.80	YES
8.46	8.39	-0.67	N/A	YES
Linearity = 1.006				

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


THERMO 51C-HT (THC Analyzer) Linearity Plot

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	0.00	0.00	0.00	YES (%)
8.91	8.91	0.00	0.00	YES (%)
19.10	19.20	0.52	0.10	YES (%)
Linearity = 0.995				


THERMO 410i (CO_2 Analyzer) Linearity Plot

NOx Converter Efficiency

Date: March 20, 2011
Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**1.77**
	Analyzer Reading, NOx Channel, ppmvd	**48.88**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**47.11**
	Converter Efficiency, %	**97.74**

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.

$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V}\right) \times 100 \quad \text{Eq. 7E-7} = \frac{47.11 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 97.74\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/20/11 07:14:16	2280	48.79	1.85
03/20/11 07:14:46	2310	48.85	1.80
03/20/11 07:15:16	2340	48.86	1.78
03/20/11 07:15:46	***2370***	***48.88***	***1.77***
03/20/11 07:16:16	2400	48.87	1.78
03/20/11 07:16:46	2430	48.92	1.78
03/20/11 07:17:16	2460	42.76	2.36

DRIFT AND BIAS CHECK

Strat Test Pre and Post QA/QC Check	O2	CO	NOx
Initial Zero	0.01	0.02	0.09
Final Zero	0.04	-0.03	0.07
Avg. Zero	0.03	-0.01	0.08
Initial UpScale	12.15	5.06	4.93
Final UpScale	12.20	5.07	4.93
Avg. UpScale	12.18	5.07	4.93
Sys Resp (Zero)	0.03	0.08	0.03
Sys Resp (Upscale)	12.34	5.10	5.00
Upscale Cal Gas	12.10	4.92	4.93
Initial Zero Bias	-0.09%	-0.50%	0.50%
Final Zero Bias	0.05%	-0.91%	0.33%
Zero Drift	0.14%	0.41%	0.17%
Initial Upscale Bias	-0.90%	-0.33%	-0.58%
Final Upscale Bias	-0.66%	-0.25%	-0.58%
Upscale Drift	0.24%	0.08%	0.00%
Alternative Specification Abs Diff			
Initial Zero	0.02	0.06	0.06
Final Zero	0.01	0.11	0.04
Initial Upscale	0.19	0.04	0.07
Final Upscale	0.14	0.03	0.07
Calibration Span	21.10	12.10	12.10
3% of Range (drift)	0.63	0.36	0.36
5% of Range (bias)	1.06	0.61	0.61

Respone Time (min)	0.7	1.3	1.3
Sys. Response (min)	1.3		

Date/Time mm/dd/yy hh:mm:ss	z	O2 %	s	z	CO ppm	s	z	NOx ppm	s	INJECTIONS
03/19/11 07:57:10		13.07			0.54			2.50		x
03/19/11 07:57:20		13.06			0.52			2.51		
03/19/11 07:57:30		8.50			0.47			2.51		
03/19/11 07:57:40		11.09			0.37			2.52		
03/19/11 07:57:50		**12.10**	x		0.28			2.14		
03/19/11 07:58:00		**12.13**		x	**0.15**			1.15		
03/19/11 07:58:10		**12.12**			**-0.08**			0.46		
03/19/11 07:58:20		**12.15**			**-0.05**		x	**0.24**		
03/19/11 07:58:30		**12.14**			**-0.02**			**0.09**		
03/19/11 07:58:40		**12.14**			**-0.06**			**0.08**		
03/19/11 07:58:50		**12.14**			**0.03**			**0.08**		
03/19/11 07:59:00		**12.15**			**-0.04**			**0.07**		
03/19/11 07:59:10		**12.14**			**-0.01**			**0.06**		x
03/19/11 07:59:20		**12.15**			**-0.13**			**0.06**		
03/19/11 07:59:30		**12.14**			**-0.04**			**0.06**		
03/19/11 07:59:40		5.09			**0.10**			**0.06**		
03/19/11 07:59:50	x	**0.20**			0.82			0.38		
03/19/11 08:00:00		**0.07**			2.43			1.13		
03/19/11 08:00:10		**0.03**			3.76			2.14		
03/19/11 08:00:20		**0.03**			4.51			3.70		
03/19/11 08:00:30		**0.02**			**4.82**	x		**4.72**	x	
03/19/11 08:00:40		**0.01**			**4.97**			**4.80**		
03/19/11 08:00:50		**0.00**			**4.98**			**4.85**		
03/19/11 08:01:00		**0.01**			**5.08**			**4.86**		
03/19/11 08:01:10		**-0.01**			**5.17**			**4.87**		
03/19/11 08:01:20		**-0.02**			**4.97**			**4.88**		
03/19/11 08:01:30		**-0.02**			**4.97**			**4.89**		

DRIFT AND BIAS CHECK

	Base Load, Run - 1	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.17	2.45	0.59	0.46	4.73
	Corrected Average	13.09	2.41	0.58	0.48	4.53
	Initial Zero	0.01	0.09	0.02	-0.03	0.13
	Final Zero	0.04	0.07	-0.03	0.10	0.49
	Avg. Zero	0.03	0.08	-0.01	0.04	0.31
	Initial UpScale	12.15	4.93	5.06	3.02	8.87
	Final UpScale	12.20	4.93	5.07	3.10	9.16
	Avg. UpScale	12.18	4.93	5.07	3.06	9.02
	Sys Resp (Zero)	0.03	0.03	0.08	-0.03	0.04
	Sys Resp (Upscale)	12.34	5.00	5.10	3.02	8.97
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	-0.09%	0.50%	-0.50%	0.00%	0.47%
	Final Zero Bias	0.05%	0.33%	-0.91%	1.24%	2.36%
	Zero Drift	0.14%	0.17%	0.41%	1.24%	1.88%
	Initial Upscale Bias	-0.90%	-0.58%	-0.33%	0.00%	-0.52%
	Final Upscale Bias	-0.66%	-0.58%	-0.25%	0.76%	0.99%
	Upscale Drift	0.24%	0.00%	0.08%	0.76%	1.52%
Alternative Specification Abs Diff	Initial Zero	0.02	0.06	0.06	--	0.09
	Final Zero	0.01	0.04	0.11	--	0.45
	Initial Upscale	0.19	0.07	0.04	--	0.10
	Final Upscale	0.14	0.07	0.03	--	0.19
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base Load, Run - 2	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.25	2.26	0.53	0.70	4.87
	Corrected Average	13.09	2.23	0.55	0.79	4.42
	Initial Zero	0.04	0.07	0.07	0.10	0.49
	Final Zero	0.13	0.07	-0.15	-0.15	0.67
	Avg. Zero	0.09	0.07	-0.04	-0.03	0.58
	Initial UpScale	12.20	4.93	4.99	3.10	9.16
	Final UpScale	12.30	4.90	5.08	3.08	9.30
	Avg. UpScale	12.25	4.92	5.04	3.09	9.23
	Sys Resp (Zero)	0.03	0.03	0.08	-0.03	0.04
	Sys Resp (Upscale)	12.34	5.00	5.10	3.02	8.97
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	0.05%	0.33%	-0.08%	1.24%	2.36%
	Final Zero Bias	0.47%	0.33%	-1.90%	-1.14%	3.30%
	Zero Drift	0.43%	0.00%	1.82%	2.38%	0.94%
	Initial Upscale Bias	-0.66%	-0.58%	-0.91%	0.76%	0.99%
	Final Upscale Bias	-0.19%	-0.83%	-0.17%	0.57%	1.73%
	Upscale Drift	0.47%	0.25%	0.74%	0.19%	0.73%
Alternative Specification Abs Diff	Initial Zero	0.01	0.04	0.01	--	0.45
	Final Zero	0.10	0.04	0.23	--	0.63
	Initial Upscale	0.14	0.07	0.11	--	0.19
	Final Upscale	0.04	0.10	0.02	--	0.33
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base Load, Run - 3	O_2	NOx	CO	VOC	CO_2
	Raw Average	13.38	2.30	0.51	0.04	5.00
	Corrected Average	13.13	2.29	0.64	0.30	4.41
	Initial Zero	0.13	0.07	-0.15	-0.15	0.67
	Final Zero	0.25	0.06	-0.16	-0.42	0.80
	Avg. Zero	0.19	0.07	-0.16	-0.29	0.74
	Initial UpScale	12.30	4.90	4.96	2.98	9.30
	Final UpScale	12.39	4.85	4.96	3.26	9.39
	Avg. UpScale	12.35	4.88	4.96	3.12	9.35
	Sys Resp (Zero)	0.03	0.03	0.08	-0.03	0.04
	Sys Resp (Upscale)	12.34	5.00	5.10	3.02	8.97
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	0.47%	0.33%	-1.90%	-1.14%	3.30%
	Final Zero Bias	1.04%	0.25%	-1.98%	-3.71%	3.98%
	Zero Drift	0.57%	0.08%	0.08%	2.57%	0.68%
	Initial Upscale Bias	-0.19%	-0.83%	-1.16%	-0.38%	1.73%
	Final Upscale Bias	0.24%	-1.24%	-1.16%	2.29%	2.20%
	Upscale Drift	0.43%	0.41%	0.00%	2.67%	0.47%
Alternative Specification Abs Diff	Initial Zero	0.10	0.04	0.23	--	0.63
	Final Zero	0.22	0.03	0.24	--	0.76
	Initial Upscale	0.04	0.10	0.14	--	0.33
	Final Upscale	0.05	0.15	0.14	--	0.42
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

	Base W/Db Load, Run - 4	O_2	NOx	CO	VOC	CO_2
	Raw Average	12.38	2.60	1.12	1.14	4.81
	Corrected Average	12.21	2.57	1.16	1.41	4.90
	Initial Zero	0.05	0.11	0.00	-0.15	-0.01
	Final Zero	0.18	0.03	-0.18	-0.27	0.06
	Avg. Zero	0.12	0.07	-0.09	-0.21	0.03
	Initial UpScale	12.24	4.99	5.03	3.09	8.68
	Final UpScale	12.31	4.86	5.04	3.00	8.78
	Avg. UpScale	12.28	4.93	5.04	3.05	8.73
	Sys Resp (Zero)	0.01	0.00	-0.08	0.18	0.00
	Sys Resp (Upscale)	12.30	4.98	4.99	3.09	8.91
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	0.19%	0.91%	0.66%	-3.14%	-0.05%
	Final Zero Bias	0.81%	0.25%	-0.83%	-4.29%	0.31%
	Zero Drift	0.62%	0.66%	1.49%	1.14%	0.37%
	Initial Upscale Bias	-0.28%	0.08%	0.33%	0.00%	-1.20%
	Final Upscale Bias	0.05%	-0.99%	0.41%	-0.86%	-0.68%
	Upscale Drift	0.33%	1.07%	0.08%	0.86%	0.52%
Alternative Specification Abs Diff	Initial Zero	0.04	0.11	0.08	--	0.01
	Final Zero	0.17	0.03	0.10	--	0.06
	Initial Upscale	0.06	0.01	0.04	--	0.23
	Final Upscale	0.01	0.12	0.05	--	0.13
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

Base W/Db Load, Run - 5		O_2	NOx	CO	VOC	CO_2
	Raw Average	12.40	2.48	1.17	1.08	4.92
	Corrected Average	12.18	2.49	1.20	1.32	4.94
	Initial Zero	0.18	0.03	-0.18	-0.27	0.06
	Final Zero	0.16	0.07	-0.01	0.01	0.12
	Avg. Zero	0.17	0.05	-0.10	-0.13	0.09
	Initial UpScale	12.31	4.86	5.04	3.00	8.78
	Final UpScale	12.32	4.88	5.08	3.00	8.80
	Avg. UpScale	12.32	4.87	5.06	3.00	8.79
	Sys Resp (Zero)	0.01	0.00	-0.08	0.18	0.00
	Sys Resp (Upscale)	12.30	4.98	4.99	3.09	8.91
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	0.81%	0.25%	-0.83%	-4.29%	0.31%
	Final Zero Bias	0.71%	0.58%	0.58%	-1.62%	0.63%
	Zero Drift	0.09%	0.33%	1.40%	2.67%	0.31%
	Initial Upscale Bias	0.05%	-0.99%	0.41%	-0.86%	-0.68%
	Final Upscale Bias	0.09%	-0.83%	0.74%	-0.86%	-0.58%
	Upscale Drift	0.05%	0.17%	0.33%	0.00%	0.10%
Alternative Specification Abs Diff	Initial Zero	0.17	0.03	0.10	--	0.06
	Final Zero	0.15	0.07	0.07	--	0.12
	Initial Upscale	0.01	0.12	0.05	--	0.13
	Final Upscale	0.02	0.10	0.09	--	0.11
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

DRIFT AND BIAS CHECK

Base W/Db Load, Run - 6		O_2	NOx	CO	VOC	CO_2
	Raw Average	12.50	2.57	1.33	0.74	4.97
	Corrected Average	12.21	2.59	1.36	0.85	4.95
	Initial Zero	0.16	0.07	-0.01	0.01	0.12
	Final Zero	0.34	0.06	-0.22	0.00	0.16
	Avg. Zero	0.25	0.07	-0.12	0.01	0.14
	Initial UpScale	12.32	4.88	5.08	3.00	8.80
	Final UpScale	12.46	4.80	5.09	2.88	8.86
	Avg. UpScale	12.39	4.84	5.09	2.94	8.83
	Sys Resp (Zero)	0.01	0.00	-0.08	0.18	0.00
	Sys Resp (Upscale)	12.30	4.98	4.99	3.09	8.91
	Upscale Cal Gas	12.10	4.93	4.92	3.10	8.91
	Initial Zero Bias	0.71%	0.58%	0.58%	-1.62%	0.63%
	Final Zero Bias	1.56%	0.50%	-1.16%	-1.71%	0.84%
	Zero Drift	0.85%	0.08%	1.74%	0.10%	0.21%
	Initial Upscale Bias	0.09%	-0.83%	0.74%	-0.86%	-0.58%
	Final Upscale Bias	0.76%	-1.49%	0.83%	-2.00%	-0.26%
	Upscale Drift	0.66%	0.66%	0.08%	1.14%	0.31%
Alternative Specification Abs Diff	Initial Zero	0.15	0.07	0.07	--	0.12
	Final Zero	0.33	0.06	0.14	--	0.16
	Initial Upscale	0.02	0.10	0.09	--	0.11
	Final Upscale	0.16	0.18	0.10	--	0.05
	Calibration Span	21.10	12.10	12.10	10.50	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.32	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.53	0.96

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Make:	Thermo Environmental	Date:	03/04/11
Model #:	MST-C1	Barometric Pressure:	29.85 (in. Hg)
Serial #:	90693	Theoretical Critical Vacuum:	14.08 (in. Hg)

DRY GAS METER READINGS

ΔH	Time	Volume			Initial Temperature	
		Initial	Final	Total	Inlet	Outlet
(in. H2O)	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)
0.78	17.00	91.440	100.260	8.820	84.0	79.0
1.10	12.00	100.260	107.390	7.130	77.0	77.0
1.40	10.00	107.390	114.280	6.890	75.0	75.0
2.30	10.00	114.280	123.040	8.760	75.0	75.0
3.50	10.00	123.040	133.620	10.580	75.0	74.0

Final Temperature		Orifice	K' Orifice	Actual	Ambient Temperature		
Inlet	Outlet	Serial#	Coefficient	Vacuum	Initial	Final	Average
(°F)	(°F)	(number)	(see above)	(in. Hg)	(°F)	(°F)	(°F)
77.0	77.0	15	0.3865	16.0	69.6	70.0	69.8
75.0	75.0	17	0.4454	16.0	70.0	70.0	70.0
75.0	75.0	19	0.5196	16.0	70.0	70.2	70.1
75.0	74.0	25	0.6642	15.5	70.2	70.2	70.2
77.0	74.0	30	0.8090	14.5	70.0	69.8	69.9

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)
8.629	244.37	8.521	241.3	8.573
7.023	198.90	6.930	196.3	6.975
6.805	192.71	6.737	190.8	6.782
8.675	245.66	8.610	243.8	8.670
10.503	297.44	10.490	297.1	10.557

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
-0.004	0.987	1.710	43.43	-0.035
-0.004	0.987	1.823	46.31	0.078
-0.001	0.990	1.709	43.40	-0.037
0.001	0.993	1.720	43.68	-0.025
0.008	0.999	1.765	44.82	0.019
AVERAGE:	**0.991**	**1.745**	44.33	**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 dH@, the orifice differential pressure in inches of H_20 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: 03/04/11 03/04/11

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693

Date:
Barometric Pressure: 29.85 (in. Hg)
Temperature (ASTM cal): 67.90 (°F)

Thermocouple	100	(°F)	600	(°F)	1200	(°F)
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	99.00	0.50	600.00	0.00	1197.00	0.25
Probe	100.00	0.00	601.00	0.17	1197.00	0.25
Filter	100.00	0.00	601.00	0.17	1197.00	0.25
Dryer	99.00	0.50	600.00	0.00	1197.00	0.25
Aux.	99.00	0.50	600.00	0.00	1197.00	0.25

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	67.90	(°F)
	Reading	(±°F)
DGM In	68.0	0.10
DGM Out	68.0	0.10

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: Craig McCarty

DATE: 03/04/11 03/04/11

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 Assett ID(s): **Probe:** samp-hp-0052 **Hotbox:** samp-bh-0014 **Gooseneck:** samp-ad-0034

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Barometric Pressure: 29.85

Thermo-couples		**Temps (°F)**	**Signature**		**Date**	
Stack	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Filter	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Exit	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				

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 Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]First (3 point)

Make:	Thermo Environmental	Date:	03/20/11
Model #:	MST-C1	Barometric Pressure:	30.18 (in. Hg)
Serial #:	90693	Theoretical Critical Vacuum:	14.24 (in. Hg)

DRY GAS METER READINGS

ΔH (in. H2O)	Time (min)	Volume			Initial Temperature	
		Initial (ft^3)	Final (ft^3)	Total (ft^3)	Inlet (°F)	Outlet (°F)
1.10	12.00	110.100	117.510	7.410	88.0	88.0
1.10	12.00	117.510	125.010	7.500	86.0	87.0
1.10	12.00	125.010	132.510	7.500	86.0	87.0

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)
86.0	87.0	17	0.4454	20.0	86.0	85.0	85.5
86.0	87.0	17	0.4454	20.0	85.0	85.0	85.0
86.0	87.0	17	0.4454	20.0	85.0	86.0	85.5

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)
7.228	204.69	6.906	195.6	7.077
7.326	207.46	6.910	195.7	7.073
7.326	207.46	6.906	195.6	7.077

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
0.008	0.956	1.817	46.15	-0.001
-0.004	0.943	1.817	46.15	-0.001
-0.004	0.943	1.819	46.20	0.001
AVERAGE:	**0.947**	**1.818**	46.17	**PASSED**

LAST 5-PT:	**0.991**	**1.745**	**PASSED**	5-PT Date:
% DIFF:	**4.6%**	**4.1%**		03/04/11

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.

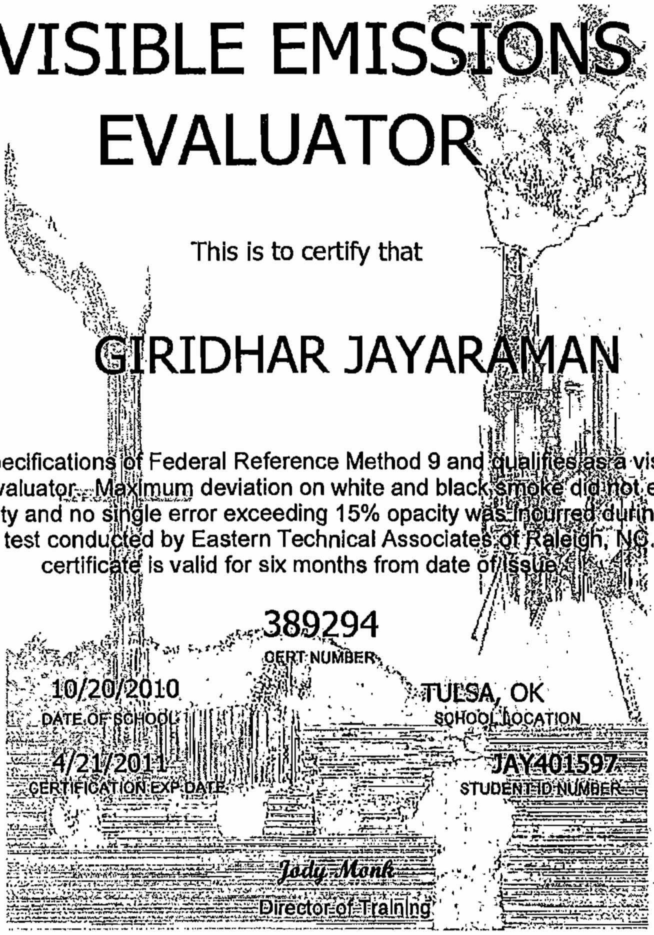
Notes: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter,acceptable tolerance of individual values from the average is +/- 0.02. For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H_20 that equates to 0.75 cfm of air at 68 °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: Thomas K Graham Thomas Graham DATE: 03/20/11

NOZZLE CALIBRATION SHEET

NOZZLE SET IDENTIFICATION: SAMP-NS-000I
CALIBRATION DATE: April 22, 2010
CALIPER NUMBER: SAMP-DC-0011
NAME OF CALIBRATOR: Jake Fahlenkamp

NOZZLE I.D.	DIAMETER	AVERAGE DIAMETER	EPA Method 5, Sec. 10.1 Criteria
I#4	0.109	0.108	PASS
	0.108		
	0.106		
I#6	0.174	0.175	PASS
	0.176		
	0.175		
I8	0.234	0.232	PASS
	0.231		
	0.232		
I#10	0.311	0.309	PASS
	0.309		
	0.308		
I#12	0.357	0.357	PASS
	0.357		
	0.356		
I#14	0.433	0.434	PASS
	0.436		
	0.434		
I#16	0.488	0.489	PASS
	0.491		
	0.489		



VISIBLE EMISSIONS EVALUATOR

This is to certify that

GIRIDHAR JAYARAMAN

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.

389294
CERT NUMBER

10/20/2010
DATE OF SCHOOL

TULSA, OK
SCHOOL LOCATION

4/21/2011
CERTIFICATION EXP DATE

JAY401597
STUDENT ID NUMBER

Jody Monk
Director of Training

EASTERN TECHNICAL ASSOCIATES

GIRIDHAR JAYARAMAN

JAY401597 STUDENT ID NUMBER

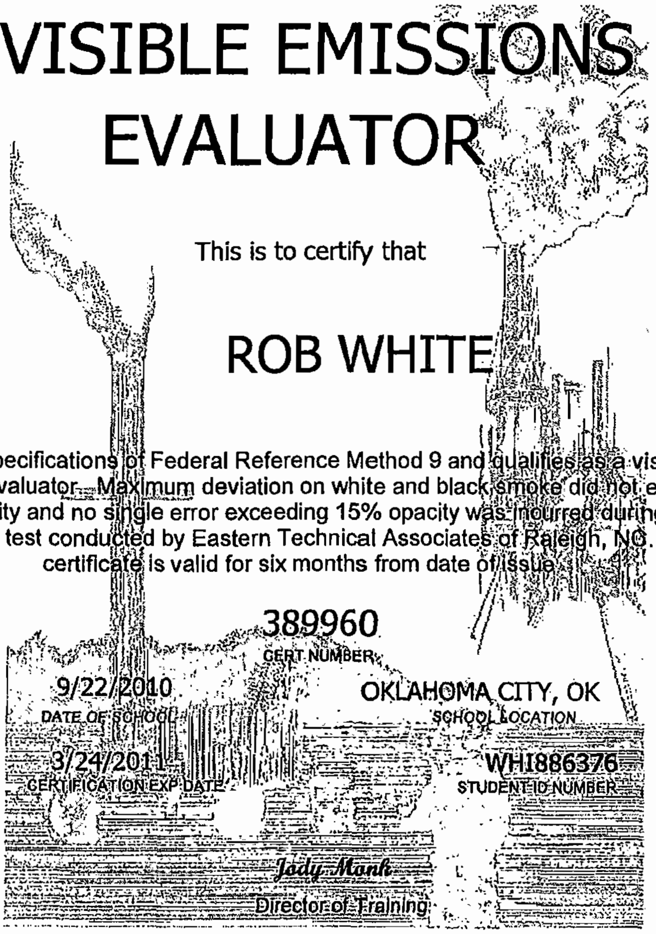
met the specifications of Federal Reference Method 9 and qualifies as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of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

TULSA, OK	10/20/2010	389294
SCHOOL LOCATION	DATE OF SCHOOL	CERT NUMBER
TULF10	4/21/2011	
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



VISIBLE EMISSIONS EVALUATOR

This is to certify that

ROB WHITE

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.

389960
CERT NUMBER

9/22/2010
DATE OF SCHOOL

OKLAHOMA CITY, OK
SCHOOL LOCATION

3/24/2011
CERTIFICATION EXP DATE

WHI886376
STUDENT ID NUMBER

Jody Monk
Director of Training

EASTERN TECHNICAL ASSOCIATES

ROB WHITE

WHI886376 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	389960
SCHOOL LOCATION	DATE OF SCHOOL	CERT NUMBER
TULF06	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: March 19, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular[1] Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	97.440	16.0430	15.63	94.47	994.85	969.38	895.75	872.82
Ethane	C_2H_6	0.879	30.0700	0.26	1.60	1,743.15	15.32	1,594.41	14.01
Propane	C_3H_8	0.087	44.0970	0.04	0.23	2,478.35	2.16	2,280.17	1.98
iso-Butane	iC_4H_{10}	0.009	58.1230	0.01	0.03	3,203.11	0.29	2,955.38	0.27
n-Butane	nC_4H_{10}	0.013	58.1230	0.01	0.05	3,213.35	0.42	2,965.62	0.39
Iso-Pentane	iC_5H_{12}	0.000	72.1500	0.00	0.00	3,940.87	0.00	3,643.50	0.00
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.006	86.1770	0.01	0.03	4,684.54	0.28	4,337.82	0.26
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	0.970	44.0100	0.43	2.58	0.00	0.00	0.00	0.00
Nitrogen	N_2	0.596	28.0134	0.17	1.01	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**16.55**	**100.00**	**dry**	**987.84**	**dry**	**889.73**
						wet[2,5]	**965.07**	**wet[2,5]**	**869.22**

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.547	lb/lb-mole
Btu per lb. of gas[4] =	22,998.206	gross (HHV)
Btu per lb. of gas[4] =	20,714.109	net (LHV)
Density of fuel gas[2] =	0.0430	lb/cu. ft
Wt % VOC in fuel gas =	0.34	%
Specific Gravity[1] =	0.5713	

Component	**Wt%**
carbon	72.99
oxygen	1.88
hydrogen	24.13
nitrogen	1.01
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,642.84
(Based on EPA RM-19) at 68 deg F and 14.696 psia

F-Factor Calculation:

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

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

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

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

References:

[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: 1030-2011030440-001A

March 29, 2011

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

Sample ID:		Sampled By:	JRF	
Station Name :	Unit 3B w/o Duct Burners	Sample Of:	Gas	Spot
Station Number :		Sample Date:	03/19/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:		PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/24/2011 9:22:06
Nitrogen	0.596	1.009				
Carbon Dioxide	0.970	2.580				
Methane	97.440	94.470				
Ethane	0.879	1.597	0.234			
Propane	0.087	0.232	0.024			
Iso Butane	0.009	0.032	0.003			
n-Butane	0.013	0.046	0.004			
Hexanes Plus	0.006	0.034	0.003			
	100.000	100.000	0.268			
	C2 +	**C3 +**	**iC5 +**			
GPM TOTAL :	0.268	0.034	0.003			
Relative Density	Real Gas			0.5722		
Calculated Molecular Weight				16.55		
Compressibility Factor				0.9980		

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	1005
	Saturated Basis	987

Comments :

Cylinder Number 3880

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: 1030-2011030440-002A

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

March 29, 2011

Sample ID:
Station Name: Unit 3B w/ Duct Burners
Station Number :
Location: Tulsa, OK
Sample Point:

Sampled By: JRF
Sample Of: Gas
Sample Date: 03/20/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	<0.032	gr/100 cu.ft.		EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	<1.0	PPMW	1.0	EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	<0.0001	Wt%.		EM	03/24/11

Comments: Cylinder Number: 881

Sample On: 03/20/2011

Hydrocarbon Laboratory Manager

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

Client: Florida Power and Light
Location: West County Energy Center
Date: March 20, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular[1] Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	94.982	16.0430	15.24	89.44	994.85	944.92	895.75	850.81
Ethane	C_2H_6	2.398	30.0700	0.72	4.23	1,743.15	41.80	1,594.41	38.23
Propane	C_3H_8	0.389	44.0970	0.17	1.01	2,478.35	9.64	2,280.17	8.87
iso-Butane	iC_4H_{10}	0.056	58.1230	0.03	0.19	3,203.11	1.79	2,955.38	1.66
n-Butane	nC_4H_{10}	0.065	58.1230	0.04	0.22	3,213.35	2.09	2,965.62	1.93
Iso-Pentane	iC_5H_{12}	0.000	72.1500	0.00	0.00	3,940.87	0.00	3,643.50	0.00
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.018	86.1770	0.02	0.09	4,684.54	0.84	4,337.82	0.78
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	1.471	44.0100	0.65	3.80	0.00	0.00	0.00	0.00
Nitrogen	N_2	0.621	28.0134	0.17	1.02	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**17.04**	**100.00**	**dry**	**1,001.09**	**dry**	**902.27**
						wet[2,5]	**978.01**	**wet[2,5]**	**881.47**

Characteristics of Fuel Gas		
Molecular Weight of gas =	17.038	lb/lb-mole
Btu per lb. of gas[4] =	22,635.016	gross (HHV)
Btu per lb. of gas[4] =	20,400.709	net (LHV)
Density of fuel gas[2] =	0.0442	lb/cu. ft
Wt % VOC in fuel gas =	1.51	%
Specific Gravity[1] =	0.5883	

Component	**Wt%**
carbon	72.62
oxygen	2.76
hydrogen	23.60
nitrogen	1.02
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,653.75
(Based on EPA RM-19) at 68 deg F and 14.696 psia

F-Factor Calculation:

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

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

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

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

References:

[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: 1030-2011030440-002A

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

March 25, 2011

Sample ID:		Sampled By:	JRF	
Station Name :	Unit 3B w/ Duct Burners	Sample Of:	Gas	Spot
Station Number :		Sample Date:	03/20/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:		PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/24/2011 9:22:07
Nitrogen	0.621	1.021				
Carbon Dioxide	1.471	3.800				
Methane	94.982	89.429				
Ethane	2.398	4.232	0.640			
Propane	0.389	1.007	0.107			
Iso Butane	0.056	0.191	0.018			
n-Butane	0.065	0.222	0.020			
Hexanes Plus	0.018	0.098	0.008			
	100.000	100.000	0.793			

	C2 +	C3 +	iC5 +
GPM TOTAL :	0.793	0.153	0.008

Relative Density	Real Gas	0.5893
Calculated Molecular Weight		17.04
Compressibility Factor		0.9978

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	1019
	Saturated Basis	1001

Comments :

Cylinder Number 881

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: 1030-2011030440-002A

March 24, 2011

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

Sample ID:
Station Name: Unit 3B w/ Duct Burners
Station Number :
Location: Tulsa, OK
Sample Point:

Sampled By: JRF
Sample Of: Gas
Sample Date: 03/20/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	<1.0	PPMW	1.0	EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	<0.0001	Wt%.		EM	03/24/11
Total Sulfur By UV	ASTM-D-6667	<0.032	gr/100 cu.ft.		EM	03/24/11

Comments: Cylinder Number: 881

Sample On: 03/20/2011

Hydrocarbon Laboratory Manager

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

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Air Hygiene International, Inc.
5634 S. 122nd East Ave, Suite F
Tulsa, Oklahoma 74146
(888) 461-3778
www.airhygiene.com

Project Number:	bv-10-westcounty.fl-comp#1	Laboratory Analysis Requested:	
Person Taking Samples:	JRF		

Sample Number	Location	Date	Volume	Analysis Method			
				ASTM 6667	GPA 2261		
003880	Unit 3B w/o DB	3/19/2011		X	X		
000881	Unit 3B w/DB	3/20/2011		X	X		
	email to: jake@airhygiene.com						
	Sulfur reported in gr/100 dscf, wt%, and ppmw						

Relinquished by: (Signature) Date: Time: Received by: (Signature) Date: 3/22/11 Time: 2:35pm

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

Copy of Chain of Custody-AHI v1.1

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	03/19/11
Project #	bv-10-westcounty.fl-comp#2
Unit Number	3B
Load	Base Load
Number of Ports Available	4
Number of Ports Used	4

Stack and Test Type	
○ Isokinetic Traverse (Wet Chemistry Testing)	**Circular Stack**
○ Velocity Traverse (Flow and Flow RATA Test)	
● **Stratification Traverse (Compliance Test)** ☐ RM 20	
○ Stratification Traverse (RATA) ☐ Part 60 ☐ Part 75	

METHOD 1 - STRATIFICATION TEST FOR A CIRCULAR SOURCE

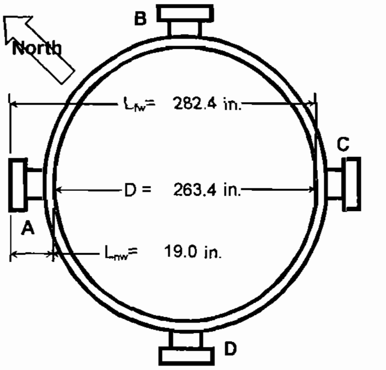
Company	Florida Power and Light	**Date**	03/19/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
Equipment	Mitsubishi 501G	**# of Ports Available**	4
Location	Loxahatchee, Florida	**# of Ports Used**	4

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_s)	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

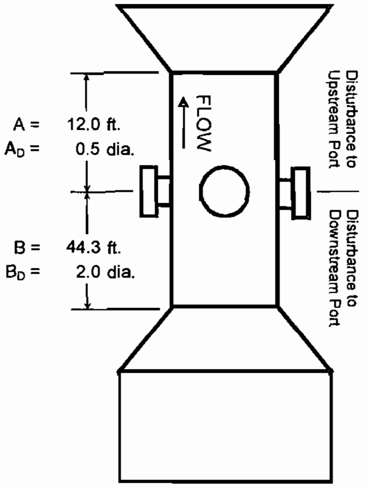


Number of Traverse Points Required

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 Stratification	
				Criteria	Points
2.00-4.99	0.50-1.24	24	16	● RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	○ 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		
>= 8.00	>=2.00	8 or 12[2]	8 or 12[2]	Minimum Number of	
Upstream Spec		24	16	Traverse Points	
Downstream Spec		24	16	RATA Stratification	
Traverse Pts Required		24	16	Criteria	Points
				○ Part75/60	12 RM1 pts
				○ 75 abrv (a)	3 points
				○ 75 abrv (b)	6 points

[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

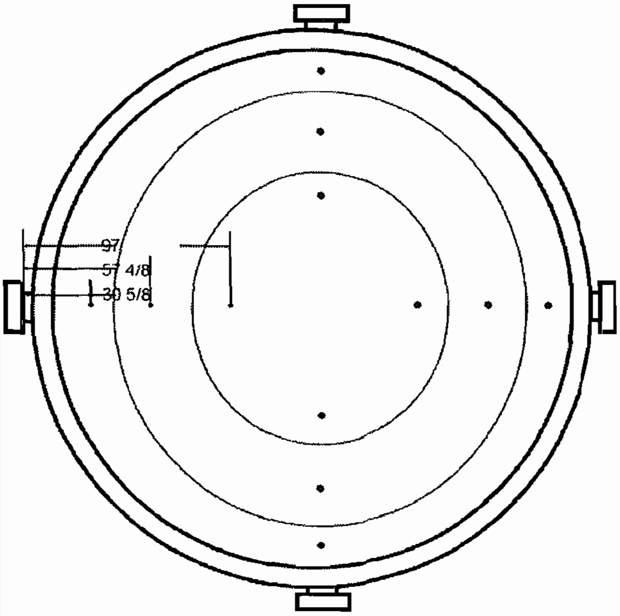


Number of Traverse Points Used

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**	03/19/11
Plant Name	West County Energy Center		**Project #**	bv-10-westcounty.fl-comp#2
Equipment	Mitsubishi 501G		**# of Ports Available**	4
Location	Loxahatchee, Florida		**# of Ports Used**	4

Stack Dimensions			
Diameter or Length of Stack	(D)	263.38	in.
Width of Stack	(W)		in.
Area of Stack	(A_s)	378.35	ft^2

Traverse Data			
4	**Ports by**	3	**Pts / port**
12	**Pts Used**	12	**Required**
Run Start	8:47:10	**Run End**	9:26:40

Traverse Point	Time Per Point	Point Start Time	Point Stop Time (Reading)	O2	Percent Difference	CO	Percent Difference	NOx	Percent Difference
	min.	hh:mm:ss	hh:mm:ss	%	%	ppm	%	ppm	%
D-3	3.00	8:47:10	8:50:10	13.09	**0.30%**	0.55	7.84%	2.69	9.91%
D-2	3.00	8:50:10	8:53:10	13.10	0.23%	0.51	0.00%	2.58	5.41%
D-1	3.00	8:53:10	8:56:10	13.10	0.23%	0.55	7.84%	2.53	3.37%
C-3	4.50	8:56:10	9:00:40	13.09	**0.30%**	0.50	1.96%	2.88	17.67%
C-2	3.00	9:00:40	9:03:40	13.12	0.08%	0.45	11.76%	2.46	0.51%
C-1	3.00	9:03:40	9:06:40	13.12	0.08%	0.51	0.00%	2.18	10.93%
B-3	4.00	9:06:40	9:10:40	13.15	0.15%	0.45	11.76%	2.94	**20.12%**
B-2	3.00	9:10:40	9:13:40	13.16	0.23%	0.50	1.96%	2.19	10.52%
B-1	3.00	9:13:40	9:16:40	13.16	0.23%	0.52	1.96%	2.13	12.97%
A-3	4.00	9:16:40	9:20:40	13.15	0.15%	0.55	7.84%	2.32	5.21%
A-2	3.00	9:20:40	9:23:40	13.17	0.30%	0.61	**19.61%**	2.22	9.30%
A-1	3.00	9:23:40	9:26:40	13.15	0.15%	0.42	17.65%	2.25	8.07%
Average				13.13		0.51		2.45	

STRAT TEST DETERMINED SAMPLE POINTS FOR CIRCULAR STACK

Company	Florida Power and Light	**Date**	03/19/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
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**	8:47:10	**Run End**	9:26:40

40 CFR 60, Appendix A, Method 7E Criteria

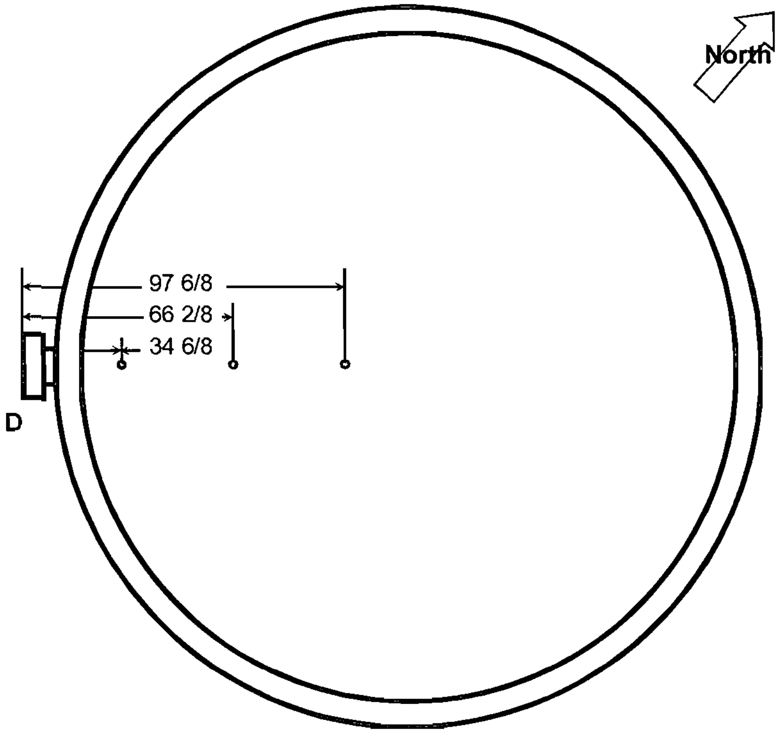
Stratification Results	
Maximum Percent Difference	20.12 % for NOx
Maximum Pollutant Conc. Diff.	0.49 ppm for NOx
Maximum Diluent Conc. Diff.	0.04 % for O2
Stack Diameter	263.38 in.

Traverse Point Number	**Percent of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
	%	in.	in.
1	6.0%	15 6/8	34 6/8
2	17.9%	47 2/8	66 2/8
3	29.9%	78 6/8	97 6/8

Stratification Conclusions	
Maximum % Diff.	Percent Diff. >10% Failed Stratification Test
Maximum Conc. Diff.	Conc. Diff. ≤ 0.5% Passed 3A 8.1 Three Pt. Criteria
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
☐ Moisture, for MW
☐ Moisture, for wet-to-dry
☑ Gas
☐
☐ 6.5.6(b)(2) alt. points could apply



AIR HYGIENE, INC.

Testing Solutions for a Better World

RECEIVED
APR 27 2011
BUREAU OF
AIR REGULATION

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3C
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 12-13, 2011

Corporate Headquarters
5634 S. 122nd E. Ave. Suite F
Tulsa, OK 74146

AIR HYGIENE, INC.
(918) 307-8865 or (888) 461-8778
www.airhygiene.com

Remote Testing Offices
Las Vegas, NV 89156
Ft. Worth, TX 76028
Humble, TX 77338
Shreveport, LA 71115
Miami, FL 33101
Philadelphia, PA 19136

EMISSION COMPLIANCE TEST
FOR THE
MITSUBISHI, MODEL 501G, UNIT 3C
PREPARED FOR
FLORIDA POWER AND LIGHT
AT THE
WEST COUNTY ENERGY CENTER
LOXAHATCHEE, FLORIDA
MARCH 12-13, 2011

Prepared and Reviewed by:

M Sharief

Mars Sharief, QSTI, Director of Specialty Testing

Paul R Little

Paul Little, QSTI, Director of Customer Service

Jake Fahlenkamp, QSTI, Director of Quality Assurance

Table of Contents

APPENDICES

Emissions Compliance Test
Mitsubishi, Model 501G, Unit 3C
Florida Power and Light
West County Energy Center
Loxahatchee, Florida
March 12-13, 2011

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the emissions testing study for nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC), ammonia (NH_3), opacity, carbon dioxide (CO_2), and oxygen (O_2) from the exhaust of the Mitsubishi, Model 501G, Unit 3C 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 March 12-13, 2011.

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 two test loads (Base Load and Base Load with Duct Burners). 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 NOx, CO, VOC, NH_3, opacity, CO_2, and O_2 from the exhaust of Florida Power and Light's Mitsubishi, Model 501G, Unit 3C at Base Load and Base Load with Duct Burners of total capacity.

1.2 SUMMARY OF TEST PROGRAM

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

1.2.1 Participating Organizations
- Florida Department of Environmental Protection (FDEP)
- Florida Power and Light
- Black and Veatch
- Air Hygiene

1.2.2 Industry
- Electric Utility / Electric Services

1.2.3 Air Permit and Federal Requirements
- Permit Number: PSD-FL-396
- Emission Unit Identification (ID): 015

1.2.4 Plant Location
- West County Energy Center near Loxahatchee, Florida

1.2.5 Equipment Tested
- Mitsubishi, Model 501G, Unit 3C

1.2.6 Emission Points

- Exhaust from the Mitsubishi, Model 501G, Unit 3C
- For all gases, three sample points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3C, determined after conducting a stratification test (refer to Appendix F)
- For all NH_3 testing, 24 sampling points in the exhaust duct from the Mitsubishi, Model 501G, Unit 3C (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 3C

1.2.7 Pollutants Measured

- NOx
- CO
- VOC
- NH_3
- Opacity
- CO_2
- O_2

1.2.8 Dates of Emission Test

- March 12-13, 2011

1.3 KEY PERSONNEL

Florida Power and Light:	John Mirino	305-242-3895
Florida Power and Light:	David Fawcett	561-904-4907
Black and Veatch:	Bill Stevenson	913-458-8549
Air Hygiene:	Jake Fahlenkamp	918-307-8865
Air Hygiene:	Thomas Graham	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Florida Power and Light's Mitsubishi, Model 501G, Unit 3C located at the West County Energy Center on March 12-13, 2011 are summarized in the following table.

TABLE 2.1
SUMMARY OF MITSUBISHI, 501G, UNIT 3C RESULTS

Parameter	Base Load	Permit Limits	Base W/Db Load	Permit Limits
Date (mm/dd/yy)	03/12/11	–	03/13/11	–
Start Time (hh:mm:ss)	11:08:07	–	9:56:07	–
End Time (hh:mm:ss)	15:03:37	–	13:26:31	–
Run Duration (min / run)	60	–	60	–
Bar. Pressure (in. Hg)	30.27	–	30.29	–
Amb. Temp. (°F)	72	–	73	–
Rel. Humidity (%)	41	–	38	–
Spec. Humidity (lb water / lb air)	0.006672	–	0.006516	–
Load Designator	Base	–	Base w/DB	–
Comb. Inlet Pres. (psig)	272.4	–	273.0	–
NH3 Injection Rate (lb/hr)	259.4	–	275.0	–
Turbine Fuel Flow (lb/min)	1,853	–	1,861	–
Duct Burner Fuel Flow (lb/min)	0	–	159	–
Total Fuel Flow (SCFH)	2,578,377	–	2,812,011	–
Stack Flow (RM19) (SCFH)	59,432,441	–	59,318,624	–
Stack Moisture (% Method 4)	9.1	–	9.7	–
Heat Input (MMBtu/hr)	2,314.2	2,333	2,507.1	2,761
Power Output (megawatts)	252.9	–	253.5	–
NOx (ppmvd)	2.28	–	2.39	–
NOx (ppm@15%O_2)	1.73	2.0	1.67	2.0
NOx (ppm@15%O_2&ISO)	1.67	–	1.60	–
NOx (lb/hr)	16.21	20.0	16.95	20.0
NOx (ton/year) at 8760 hr/year	71.01	–	74.25	–
NOx (lb/MMBtu)	0.006	–	0.006	–
CO (ppmvd)	0.62	–	1.02	–
CO (ppm@15%O_2)	0.47	4.1	0.71	7.6
CO (ppm@15%O_2&ISO)	0.46	–	0.68	–
CO (lb/hr)	2.70	23.2	4.39	52.5
CO (ton/year) at 8760 hr/year	11.81	–	19.21	–
CO (lb/MMBtu)	0.001	–	0.002	–
VOC (ppmvd)	0.06	–	0.27	–
VOC (ppm@15%O_2)	0.04	1.2	0.19	1.5
VOC (ppm@15%O_2&ISO)	0.04	–	0.18	–
VOC (lb/hr)	0.14	4.1	0.67	5.4
VOC (ton/year) at 8760 hr/year	0.62	–	2.91	–
VOC (lb/MMBtu)	0.000	–	0.000	–
Sulfur (gr S/100 scf)	<0.032	2	<0.032	2
NH_3 (ppmvd)	2.48	–	1.87	–
NH_3 (ppm@15%O_2)	1.87	5	1.30	5
Opacity (%)	0	10	0	10
CO_2 (%)	4.23	–	4.76	–
O_2 (%)	13.09	–	12.43	–

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 & 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 3,750 megawatt (MW) greenfield power plant and consists of three combined cycle units (Unit 1, 2 and 3). 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 unit 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 lower heating value (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 carbon monoxide (CO), particulate matter (PM), sulfuric acid mist (H_2SO_4), sulfur dioxide (SO_2) and volatile organic compounds (VOCs). Dry Low-NOx (DLN) combustors for gas firing and water injection for oil firing reduce nitrogen oxides (NOx) emissions. A selective catalyst reduction (SCR) system further reduces NOx emissions.

3.2 SAMPLING LOCATION

The 501G stack is circular and measures 21.9 feet (ft) (263 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 44.3 ft (531 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 NH_3 testing, an initial velocity traverse was performed across the stack at base load from 24 total points. All NH_3 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 3C 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 March 12-13, 2011.

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 6667	Fuel Gas Sample and Laboratory Analysis

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 7e, 9, 10, 19, 25a, and Conditional Test Method (CTM)-027.

Figure 4.1 depicts the sample system used for the NOx, CO, THC, CO_2, and O_2 tests. A stainless steel probe was inserted into the sample ports of the stack to extract gas measurements from the emission stream at three points located at 0.4 (15.7), 1.2 (47.2), and 2.0 (78.7) meters (inches) from the wall of the stack. 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 NOx, CO, CO_2, and O_2 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. NOx 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 (NH_3). 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 3C at each of the multiple test loads for NOx, CO, THC, CO_2, NH_3, opacity, and O_2.

The stack gas analysis for O_2 and CO_2 concentrations was performed in accordance with procedures set forth in EPA Method 3a. The O_2 analyzer uses a paramagnetic cell detector and the CO_2 analyzer uses a continuous nondispersive infrared analyzer.

EPA Method 7e was used to determine concentrations of NOx. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO_2 in nitrogen certified gas cylinder was used to verify at least a 90 percent NO_2 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
NOx	THERMO 42i-HL	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	THERMO 51C	User may select up to 10,000 ppm	0.1 ppm	Flame Ionization Detector.
O_2	THERMO 42i-HL	0-25%	0.1%	Paramagnetic cell, inherently linear.

E:\SHARED\DRAWINGS\EMISSIONS TESTING LAB.PPT 04/18/08 DRAWING:08-001 TKG

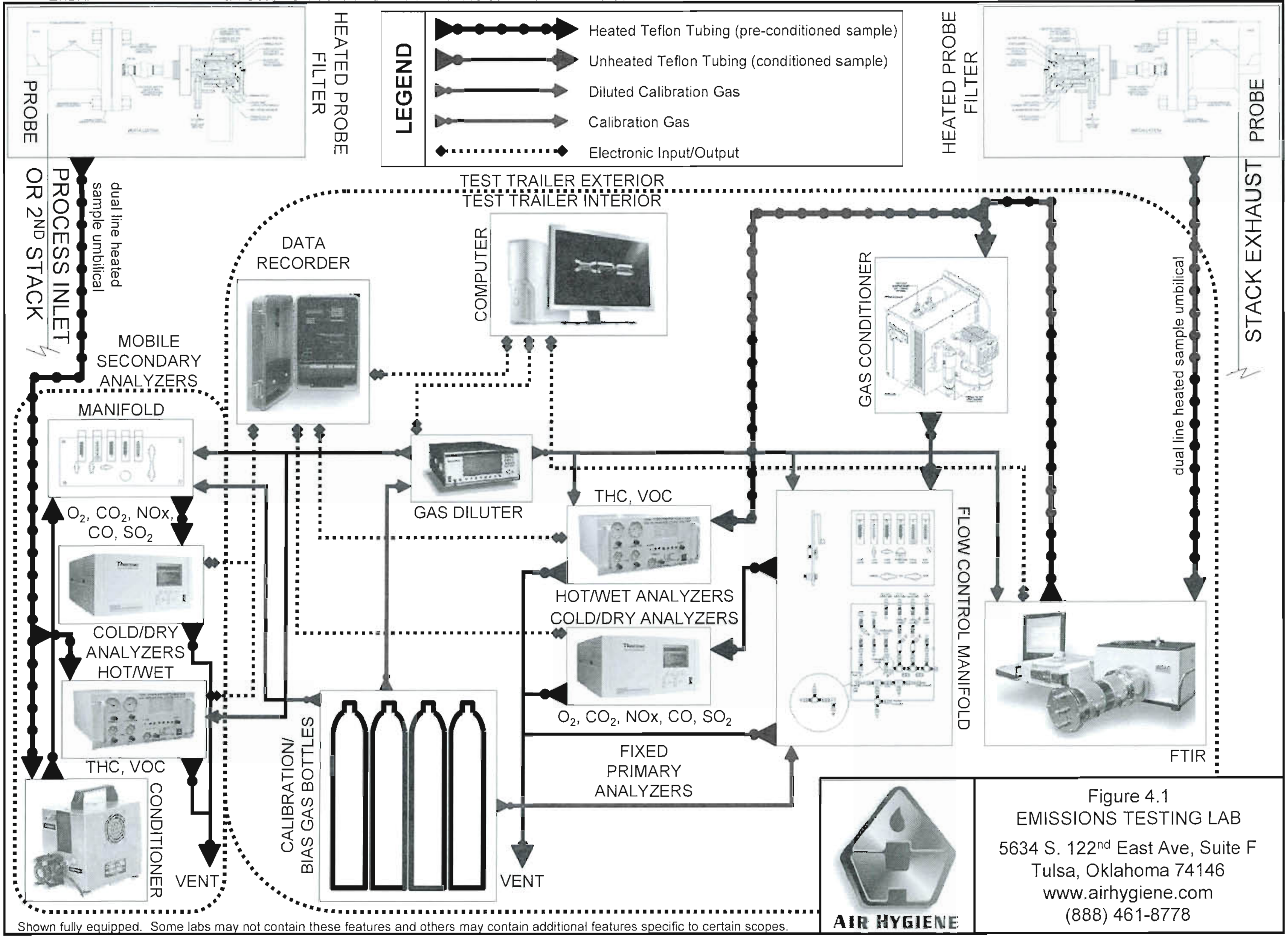
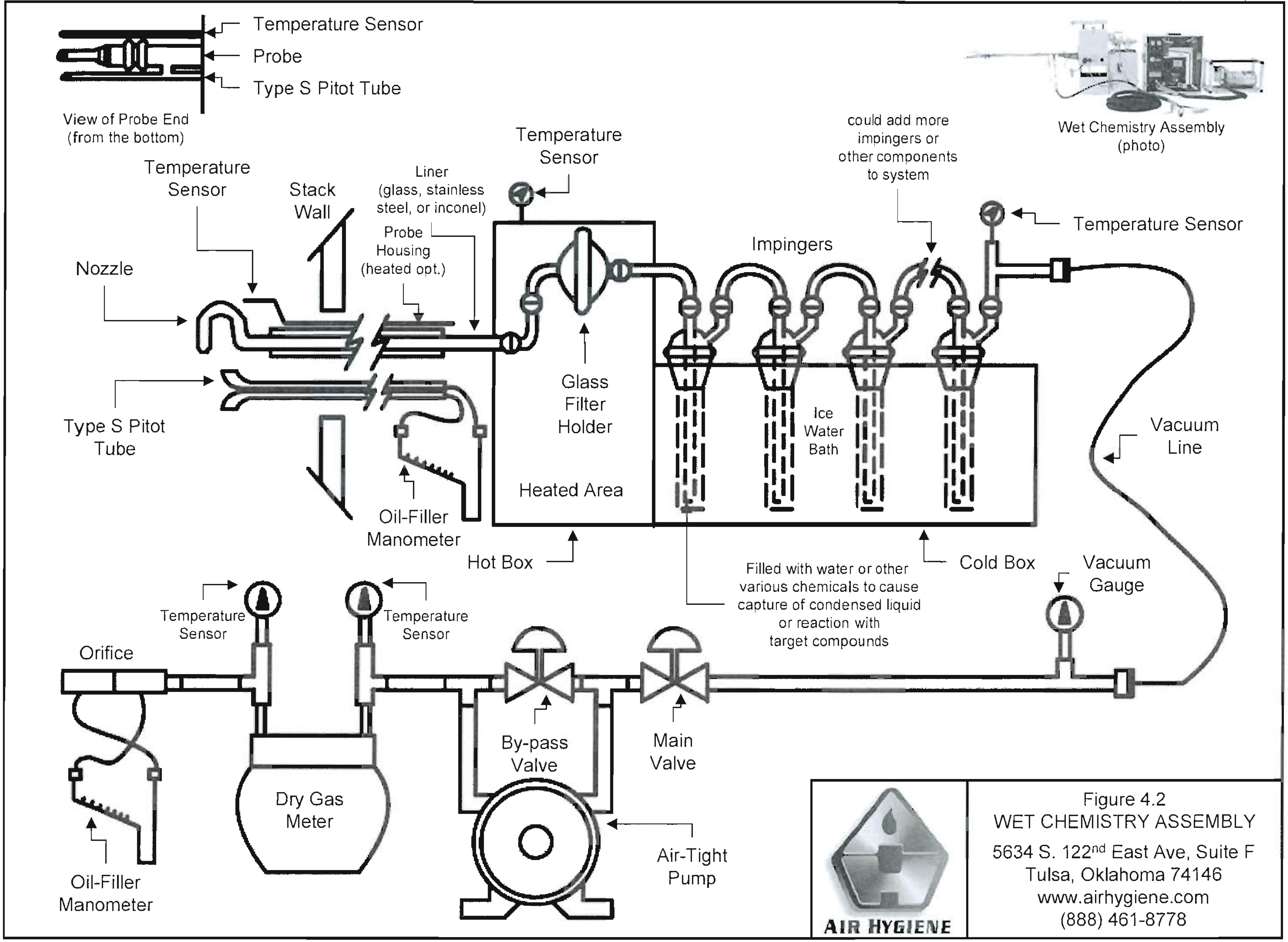


Figure 4.1
EMISSIONS TESTING LAB

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

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

E:\SHARED\DRAWINGS\SAMPLING TRAIN – GEN3.PPT 02/11/04 DRAWING:04-002 TKG



AIR HYGIENE

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
3C	Base Load	Stratification Test	1	03/12/11	9:19:07	9:59:37	EST
3C	Base	Compliance	1	03/12/11	11:08:07	12:07:37	EST
3C	Base	Compliance	2	03/12/11	12:37:07	13:36:37	EST
3C	Base	Compliance	3	03/12/11	14:04:07	15:03:37	EST
3C	Base w/DB	Compliance	4	03/13/11	9:56:07	10:55:37	DAHS
3C	Base w/DB	Compliance	5	03/13/11	11:12:01	12:11:31	DAHS
3C	Base w/DB	Compliance	6	03/13/11	12:27:01	13:26:31	DAHS
3C	Base	Preliminaries	Base-V1	03/12/11	9:00:00	9:43:00	EST
3C	Base	Ammonia	Base-1	03/12/11	11:05:00	12:20:00	EST
3C	Base	Ammonia	Base-2	03/12/11	12:37:00	13:53:00	EST
3C	Base	Ammonia	Base-3	03/12/11	14:03:00	15:17:00	EST
3C	Base w/DB	Ammonia	Base w/DB-1	03/13/11	9:55:00	11:08:00	DAHS
3C	Base w/DB	Ammonia	Base w/DB-2	03/13/11	11:23:00	12:35:00	DAHS
3C	Base w/DB	Ammonia	Base w/DB-3	03/13/11	12:52:00	14:05:00	DAHS
3C	Base	Opacity	1	03/13/11	11:05:00	12:04:00	EST
3C	Base	Opacity	2	03/13/11	12:07:00	13:06:00	EST
3C	Base	Opacity	3	03/13/11	13:10:00	14:09:00	EST
3C	Base w/DB	Opacity	1	03/13/11	11:06:00	12:05:00	EST
3C	Base w/DB	Opacity	2	03/13/11	12:07:00	13:06:00	EST
3C	Base w/DB	Opacity	3	03/13/11	13:08:00	14:07:00	EST

Note: DAHS Time (EST minus 1hr)

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load

TABLE A.2
MITSUBISHI, 501G, UNIT 3C BASE LOAD DATA SUMMARY

Parameter	Base Load, Run - 1-1	Base Load, Run - 1-2	Base Load, Run - 1-3	Average
Date (mm/dd/yy)	03/12/11	03/12/11	03/12/11	03/12/11
Start Time (hh:mm:ss)	11:08:07	12:37:07	14:04:07	11:08:07
End Time (hh:mm:ss)	12:07:37	13:36:37	15:03:37	15:03:37
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.28	30.26	30.28	30.27
Amb. Temp. (°F)	70	73	72	72
Rel. Humidity (%)	41	42	40	41
Spec. Humidity (lb water / lb air)	0.006292	0.007150	0.006573	0.006672
Load Designator	Base	Base	Base	Base
Comb. Inlet Pres. (psig)	273.9	272.2	271.1	272.4
NH3 Injection Rate (lb/hr)	264.6	259.0	254.7	259.4
Turbine Fuel Flow (lb/min)	1,860	1,851	1,847	1,853
Duct Burner Fuel Flow (lb/min)	0	0	0	0
Total Fuel Flow (SCFH)	2,588,030	2,576,145	2,570,955	2,578,377
Stack Flow (RM19) (SCFH)	59,858,589	59,470,048	58,968,684	59,432,441
Stack Moisture (% Method 4)	9.0	9.3	8.9	9.1
Heat Input (MMBtu/hr)	2,322.9	2,312.2	2,307.6	2,314.2
Power Output (megawatts)	255.0	252.6	251.2	252.9
NOx (ppmvd)	2.22	2.35	2.28	2.28
NOx (ppm@15%O_2)	1.68	1.78	1.72	1.73
NOx (ppm@15%O_2&ISO)	1.63	1.73	1.66	1.67
NOx (lb/hr)	15.86	16.71	16.07	16.21
NOx (ton/year) at 8760 hr/year	69.45	73.21	70.39	71.01
NOx (lb/MMBtu)	0.006	0.007	0.006	0.006
CO (ppmvd)	0.63	0.61	0.63	0.62
CO (ppm@15%O_2)	0.48	0.46	0.48	0.47
CO (ppm@15%O_2&ISO)	0.46	0.45	0.46	0.46
CO (lb/hr)	2.75	2.63	2.72	2.70
CO (ton/year) at 8760 hr/year	12.03	11.51	11.90	11.81
CO (lb/MMBtu)	0.001	0.001	0.001	0.001
VOC (ppmvd)	0.07	0.01	0.09	0.06
VOC (ppm@15%O_2)	0.05	0.01	0.07	0.04
VOC (ppm@15%O_2&ISO)	0.05	0.01	0.07	0.04
VOC (lb/hr)	0.17	0.03	0.23	0.14
VOC (ton/year) at 8760 hr/year	0.76	0.11	0.99	0.62
VOC (lb/MMBtu)	0.000	0.000	0.000	0.000
Sulfur (gr S/100 scf)	<0.032	<0.032	<0.032	<0.032
NH_3 (ppmvd)	2.13	2.27	3.04	2.48
NH_3 (ppm@15%O_2)	1.61	1.72	2.28	1.87
Opacity (%)	0	0	0	0
CO_2 (%)	4.24	4.22	4.22	4.23
O_2 (%)	13.12	13.11	13.05	13.09

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,860	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,588,030	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	41
Ambient Temperature	70
Specific Humidity	0.006292

Unit Data

Unit Load	255.0	megawatts
Heat Input	2,323	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,858,589	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/12/11 11:08:07	12300	13.06	2.75	0.51	0.00	4.32
03/12/11 11:08:37	12330	13.06	2.79	0.48	0.00	4.33
03/12/11 11:09:07	12360	13.06	2.86	0.42	0.00	4.31
03/12/11 11:09:37	12390	13.05	2.88	0.55	0.00	4.34
03/12/11 11:10:07	12420	13.09	2.84	0.64	0.02	4.32
03/12/11 11:10:37	12450	13.05	2.70	0.84	0.00	4.32
03/12/11 11:11:07	12480	13.05	2.64	1.15	0.00	4.36
03/12/11 11:11:37	12510	13.06	2.66	0.98	0.22	4.35
03/12/11 11:12:07	12540	13.10	2.64	0.77	0.26	4.34
03/12/11 11:12:37	12570	13.13	2.63	0.72	0.02	4.32
03/12/11 11:13:07	12600	13.14	2.53	0.67	0.00	4.31
03/12/11 11:13:37	12630	13.10	2.54	0.64	0.09	4.33
03/12/11 11:14:07	12660	13.02	2.65	0.65	0.09	4.38
03/12/11 11:14:37	12690	12.99	2.77	0.74	0.00	4.38
03/12/11 11:15:07	12720	13.01	2.92	0.53	0.00	4.39
03/12/11 11:15:37	12750	13.09	2.92	0.53	0.02	4.35
03/12/11 11:16:07	12780	13.13	2.64	0.77	0.00	4.32
03/12/11 11:16:37	12810	13.15	2.43	0.85	0.00	4.32
03/12/11 11:17:07	12840	13.05	2.34	0.93	0.00	4.36
03/12/11 11:17:37	12870	13.05	2.39	1.70	0.00	4.38
03/12/11 11:18:07	12900	13.08	2.51	1.43	0.00	4.37
03/12/11 11:18:37	12930	13.11	2.58	0.85	0.00	4.33
03/12/11 11:19:07	12960	13.07	2.71	0.73	0.00	4.33
03/12/11 11:19:37	12990	13.04	2.78	0.59	0.00	4.35
03/12/11 11:20:07	13020	13.05	2.86	0.72	0.00	4.33
03/12/11 11:20:37	13050	13.08	2.87	0.82	0.00	4.33
03/12/11 11:21:07	13080	13.12	2.79	0.69	0.00	4.31
03/12/11 11:21:37	13110	13.11	2.70	0.60	0.00	4.30
03/12/11 11:22:07	13140	13.07	2.75	0.60	0.00	4.33
03/12/11 11:22:37	13170	13.02	2.83	0.44	0.00	4.35
03/12/11 11:23:07	13200	13.02	2.98	0.38	0.00	4.36
03/12/11 11:23:37	13230	13.05	3.02	0.48	0.00	4.35
03/12/11 11:24:07	13260	13.07	2.77	0.51	0.00	4.34
03/12/11 11:24:37	13290	13.09	2.62	0.62	0.00	4.34
03/12/11 11:25:07	13320	13.11	2.42	0.80	0.00	4.34
03/12/11 11:25:37	13350	13.12	2.36	0.79	0.12	4.32
03/12/11 11:26:07	13380	13.14	2.38	0.84	0.01	4.32

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,860	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,588,030	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	41
Ambient Temperature	70
Specific Humidity	0.006292

Unit Data

Unit Load	255.0	megawatts
Heat Input	2,323	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,858,589	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/12/11 11:26:37	13410	13.11	2.49	0.66	0.00	4.32
03/12/11 11:27:07	13440	13.11	2.63	0.66	0.01	4.32
03/12/11 11:27:37	13470	13.10	2.71	0.56	0.18	4.33
03/12/11 11:28:07	13500	13.09	2.72	0.57	0.02	4.33
03/12/11 11:28:37	13530	13.01	2.83	0.48	0.00	4.37
03/12/11 11:29:07	13560	13.03	2.95	0.41	0.00	4.38
03/12/11 11:29:37	13590	13.08	2.97	0.46	0.00	4.35
03/12/11 11:30:07	13620	13.12	2.80	0.59	0.00	4.34
03/12/11 11:30:37	13650	13.10	2.66	0.60	0.00	4.33
03/12/11 11:31:07	13680	13.08	2.58	0.56	0.00	4.36
03/12/11 11:31:37	13710	13.11	2.69	0.56	0.00	4.35
03/12/11 11:32:07	13740	13.08	2.70	0.52	0.09	4.35
03/12/11 11:32:37	13770	13.11	2.77	0.49	0.01	4.35
03/12/11 11:33:07	13800	13.11	2.74	0.48	0.13	4.36
03/12/11 11:33:37	13830	13.08	2.55	0.43	0.64	4.35
03/12/11 11:34:07	13860	13.07	2.25	0.50	0.37	4.37
03/12/11 11:34:37	13890	13.06	2.25	0.41	0.18	4.36
03/12/11 11:35:07	13920	13.04	2.28	0.46	0.33	4.37
03/12/11 11:35:37	13950	13.07	2.28	0.43	0.21	4.38
03/12/11 11:36:07	13980	13.07	2.23	0.45	0.01	4.35
03/12/11 11:36:37	14010	13.08	2.10	0.59	0.17	4.36
03/12/11 11:37:07	14040	13.12	2.03	0.52	0.18	4.34
03/12/11 11:37:37	14070	13.12	1.94	0.64	0.00	4.32
03/12/11 11:38:07	14100	13.07	1.91	0.57	0.00	4.36
03/12/11 11:38:37	14130	13.06	1.98	0.49	0.18	4.36
03/12/11 11:39:07	14160	13.03	2.05	0.46	0.01	4.36
03/12/11 11:39:37	14190	13.03	2.09	0.42	0.01	4.38
03/12/11 11:40:07	14220	13.09	2.11	0.47	0.16	4.34
03/12/11 11:40:37	14250	13.15	2.03	0.60	0.03	4.30
03/12/11 11:41:07	14280	13.15	1.88	0.82	0.00	4.28
03/12/11 11:41:37	14310	13.13	1.82	0.66	0.17	4.29
03/12/11 11:42:07	14340	13.11	1.88	0.62	0.07	4.31
03/12/11 11:42:37	14370	13.07	1.99	0.51	0.00	4.32
03/12/11 11:43:07	14400	13.05	2.03	0.61	0.11	4.37
03/12/11 11:43:37	14430	13.03	2.13	0.50	0.12	4.37
03/12/11 11:44:07	14460	13.04	2.18	0.44	0.00	4.38
03/12/11 11:44:37	14490	13.07	2.20	0.47	0.06	4.38

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,860	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,588,030	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	41
Ambient Temperature	70
Specific Humidity	0.006292

Unit Data

Unit Load	255.0	megawatts
Heat Input	2,323	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,858,589	SCFH

Data from: Run 1 NH3

Base 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 (%)
03/12/11 11:45:07	14520	13.08	2.20	0.48	0.05	4.36
03/12/11 11:45:37	14550	13.09	2.15	0.47	0.00	4.35
03/12/11 11:46:07	14580	13.07	2.09	0.53	0.04	4.35
03/12/11 11:46:37	14610	13.05	2.09	0.46	0.04	4.35
03/12/11 11:47:07	14640	13.05	2.13	0.48	0.00	4.35
03/12/11 11:47:37	14670	13.01	2.18	0.48	0.00	4.37
03/12/11 11:48:07	14700	13.04	2.17	0.41	0.00	4.38
03/12/11 11:48:37	14730	13.08	1.96	0.58	0.00	4.36
03/12/11 11:49:07	14760	13.13	1.85	0.63	0.04	4.34
03/12/11 11:49:37	14790	13.11	1.74	0.72	0.12	4.36
03/12/11 11:50:07	14820	13.07	1.77	0.67	0.00	4.37
03/12/11 11:50:37	14850	13.02	1.85	0.54	0.00	4.41
03/12/11 11:51:07	14880	12.99	1.93	0.47	0.07	4.42
03/12/11 11:51:37	14910	13.05	1.99	0.47	0.09	4.41
03/12/11 11:52:07	14940	13.08	1.96	0.54	0.00	4.40
03/12/11 11:52:37	14970	13.09	1.85	0.83	0.19	4.39
03/12/11 11:53:07	15000	13.12	1.79	0.74	0.26	4.38
03/12/11 11:53:37	15030	13.08	1.76	0.64	0.03	4.39
03/12/11 11:54:07	15060	13.07	1.80	0.57	0.12	4.40
03/12/11 11:54:37	15090	13.03	1.90	0.49	0.27	4.42
03/12/11 11:55:07	15120	13.06	1.96	0.50	0.03	4.40
03/12/11 11:55:37	15150	13.09	1.94	0.52	0.00	4.39
03/12/11 11:56:07	15180	13.13	1.90	0.56	0.05	4.38
03/12/11 11:56:37	15210	13.13	1.82	0.66	0.09	4.35
03/12/11 11:57:07	15240	13.09	1.83	0.58	0.00	4.38
03/12/11 11:57:37	15270	13.09	1.91	0.51	0.00	4.37
03/12/11 11:58:07	15300	13.08	1.99	0.38	0.01	4.37
03/12/11 11:58:37	15330	13.03	2.06	0.47	0.00	4.40
03/12/11 11:59:07	15360	13.04	2.14	0.39	0.00	4.39
03/12/11 11:59:37	15390	13.05	2.16	0.61	0.08	4.39
03/12/11 12:00:07	15420	13.10	2.05	0.48	0.04	4.38
03/12/11 12:00:37	15450	13.12	1.92	0.69	0.00	4.34
03/12/11 12:01:07	15480	13.13	1.80	0.73	0.10	4.35
03/12/11 12:01:37	15510	13.06	1.76	0.65	0.04	4.37
03/12/11 12:02:07	15540	13.06	1.87	0.56	0.00	4.39
03/12/11 12:02:37	15570	13.07	1.96	0.53	0.14	4.40
03/12/11 12:03:07	15600	13.09	1.97	0.48	0.06	4.38

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,860	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,588,030	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	41
Ambient Temperature	70
Specific Humidity	0.006292

Unit Data

Unit Load	255.0	megawatts
Heat Input	2,323	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	265	lb/hr
Meas. Stack Moisture	9.0	%
Stack Exhaust Flow (M19)	59,858,589	SCFH

Data from: Run 1 NH3

Base 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 (%)**
03/12/11 12:03:37	15630	13.07	1.96	0.47	0.00	4.40
03/12/11 12:04:07	15660	13.04	2.00	0.45	0.07	4.42
03/12/11 12:04:37	15690	13.00	2.07	0.40	0.00	4.44
03/12/11 12:05:07	15720	13.03	2.10	0.52	0.00	4.44
03/12/11 12:05:37	15750	13.10	2.04	0.49	0.00	4.39
03/12/11 12:06:07	15780	13.14	1.88	0.66	0.14	4.37
03/12/11 12:06:37	15810	13.14	1.74	0.69	0.01	4.37
03/12/11 12:07:07	15840	13.11	1.70	0.73	0.00	4.38
03/12/11 12:07:37	15870	13.13	1.75	0.68	0.00	4.37
RAW AVERAGE		**13.08**	**2.29**	**0.60**	**0.05**	**4.36**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
	Initial Zero	-0.02	-0.02	0.07	-0.01	0.14
	Final Zero	-0.01	0.02	-0.10	-0.01	0.24
	Avg. Zero	-0.02	0.00	-0.02	-0.01	0.19
Bias						
	Initial UpScale	12.06	5.10	4.79	2.96	8.87
	Final UpScale	12.06	5.10	4.80	2.77	9.02
	Avg. UpScale	12.06	5.10	4.80	2.87	8.95
Upscale Cal Gas		12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.12	2.22	0.63	0.07	4.24
Concentration (ppm@ 15%O_2)	N/A	1.68	0.48	0.05	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.63	0.46	0.05	N/A
Emission Rate (lb/hr)	N/A	15.86	2.75	0.17	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	69.45	12.03	0.76	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.000	N/A

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,576,145	SCFH

Weather Data

Barometric Pressure	30.26
Relative Humidity	42
Ambient Temperature	73
Specific Humidity	0.007150

Unit Data

Unit Load	252.6	megawatts
Heat Input	2,312	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	259	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,470,048	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/12/11 12:37:07	17640	13.04	2.94	0.49	0.00	4.41
03/12/11 12:37:37	17670	13.07	2.88	0.43	0.00	4.41
03/12/11 12:38:07	17700	13.09	2.80	0.52	0.00	4.39
03/12/11 12:38:37	17730	13.06	2.74	0.51	0.00	4.42
03/12/11 12:39:07	17760	13.02	2.84	0.35	0.00	4.42
03/12/11 12:39:37	17790	13.04	3.03	0.40	0.00	4.42
03/12/11 12:40:07	17820	13.06	3.03	0.40	0.00	4.41
03/12/11 12:40:37	17850	13.01	2.94	0.41	0.00	4.42
03/12/11 12:41:07	17880	13.02	2.95	0.49	0.00	4.44
03/12/11 12:41:37	17910	13.02	2.95	0.47	0.00	4.41
03/12/11 12:42:07	17940	12.99	2.97	0.47	0.00	4.45
03/12/11 12:42:37	17970	13.03	2.97	0.53	0.00	4.43
03/12/11 12:43:07	18000	13.02	2.84	0.50	0.00	4.43
03/12/11 12:43:37	18030	13.03	2.79	0.51	0.00	4.44
03/12/11 12:44:07	18060	13.04	2.75	0.49	0.00	4.43
03/12/11 12:44:37	18090	13.01	2.71	0.51	0.00	4.45
03/12/11 12:45:07	18120	13.02	2.81	0.39	0.00	4.45
03/12/11 12:45:37	18150	13.04	2.87	0.45	0.00	4.44
03/12/11 12:46:07	18180	13.09	2.85	0.57	0.01	4.43
03/12/11 12:46:37	18210	13.06	2.78	0.62	0.18	4.43
03/12/11 12:47:07	18240	13.06	2.83	0.50	0.08	4.45
03/12/11 12:47:37	18270	13.05	2.94	0.46	0.00	4.44
03/12/11 12:48:07	18300	13.05	2.99	0.49	0.08	4.44
03/12/11 12:48:37	18330	13.02	3.04	0.39	0.00	4.44
03/12/11 12:49:07	18360	12.98	3.16	0.37	0.00	4.44
03/12/11 12:49:37	18390	12.97	3.25	0.50	0.00	4.47
03/12/11 12:50:07	18420	13.02	3.26	0.51	0.00	4.43
03/12/11 12:50:37	18450	13.04	3.03	0.69	0.00	4.44
03/12/11 12:51:07	18480	13.08	2.80	0.89	0.00	4.44
03/12/11 12:51:37	18510	13.12	2.63	0.80	0.00	4.41
03/12/11 12:52:07	18540	13.09	2.60	0.66	0.00	4.43
03/12/11 12:52:37	18570	13.07	2.67	0.55	0.00	4.43
03/12/11 12:53:07	18600	13.06	2.78	0.46	0.00	4.44
03/12/11 12:53:37	18630	13.06	2.88	0.50	0.00	4.44
03/12/11 12:54:07	18660	13.04	2.93	0.46	0.00	4.44
03/12/11 12:54:37	18690	13.02	3.04	0.34	0.00	4.47
03/12/11 12:55:07	18720	13.02	3.10	0.40	0.00	4.47

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,576,145	SCFH

Weather Data

Barometric Pressure	30.26
Relative Humidity	42
Ambient Temperature	73
Specific Humidity	0.007150

Unit Data

Unit Load	252.6	megawatts
Heat Input	2,312	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	259	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,470,048	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/12/11 12:55:37	18750	13.01	3.17	0.32	0.00	4.48
03/12/11 12:56:07	18780	13.05	3.16	0.39	0.00	4.46
03/12/11 12:56:37	18810	13.04	2.96	0.47	0.00	4.44
03/12/11 12:57:07	18840	13.06	2.78	0.45	0.00	4.45
03/12/11 12:57:37	18870	13.01	2.71	0.46	0.00	4.47
03/12/11 12:58:07	18900	13.04	2.73	0.45	0.00	4.48
03/12/11 12:58:37	18930	13.07	2.71	0.48	0.00	4.47
03/12/11 12:59:07	18960	13.02	2.65	0.61	0.00	4.49
03/12/11 12:59:37	18990	13.01	2.69	0.63	0.00	4.51
03/12/11 13:00:07	19020	13.01	2.71	0.41	0.00	4.50
03/12/11 13:00:37	19050	13.05	2.75	0.46	0.00	4.50
03/12/11 13:01:07	19080	13.07	2.70	0.46	0.00	4.50
03/12/11 13:01:37	19110	13.11	2.61	0.54	0.00	4.47
03/12/11 13:02:07	19140	13.11	2.15	0.68	0.00	4.48
03/12/11 13:02:37	19170	13.03	1.99	0.53	0.08	4.51
03/12/11 13:03:07	19200	13.00	2.09	0.44	0.00	4.54
03/12/11 13:03:37	19230	13.04	2.22	0.45	0.00	4.52
03/12/11 13:04:07	19260	13.07	2.22	0.46	0.00	4.50
03/12/11 13:04:37	19290	13.06	2.13	0.54	0.00	4.51
03/12/11 13:05:07	19320	13.03	2.10	0.49	0.00	4.51
03/12/11 13:05:37	19350	13.05	2.11	0.55	0.02	4.52
03/12/11 13:06:07	19380	13.09	2.12	0.78	0.00	4.50
03/12/11 13:06:37	19410	13.08	2.03	1.12	0.00	4.48
03/12/11 13:07:07	19440	13.09	2.03	1.00	0.00	4.48
03/12/11 13:07:37	19470	13.01	2.08	0.66	0.00	4.51
03/12/11 13:08:07	19500	13.07	2.21	0.46	0.00	4.49
03/12/11 13:08:37	19530	13.12	2.23	0.51	0.00	4.46
03/12/11 13:09:07	19560	13.10	2.06	0.57	0.04	4.45
03/12/11 13:09:37	19590	13.04	2.07	0.49	0.00	4.50
03/12/11 13:10:07	19620	13.05	2.14	0.43	0.01	4.51
03/12/11 13:10:37	19650	13.12	2.20	0.45	0.02	4.47
03/12/11 13:11:07	19680	13.11	2.18	0.54	0.00	4.49
03/12/11 13:11:37	19710	13.03	2.18	0.49	0.00	4.52
03/12/11 13:12:07	19740	13.06	2.29	0.44	0.01	4.53
03/12/11 13:12:37	19770	13.10	2.28	0.49	0.00	4.50
03/12/11 13:13:07	19800	13.09	2.18	0.59	0.00	4.48
03/12/11 13:13:37	19830	13.10	2.17	0.52	0.00	4.48

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,576,145	SCFH

Weather Data

Barometric Pressure	30.26
Relative Humidity	42
Ambient Temperature	73
Specific Humidity	0.007150

Unit Data

Unit Load	252.6	megawatts
Heat Input	2,312	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	259	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,470,048	SCFH

Data from: Run 2 NH3

Base 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 (%)
03/12/11 13:14:07	19860	13.10	2.22	0.43	0.00	4.47
03/12/11 13:14:37	19890	13.08	2.24	0.44	0.00	4.47
03/12/11 13:15:07	19920	13.08	2.35	0.39	0.00	4.47
03/12/11 13:15:37	19950	13.08	2.37	0.42	0.00	4.45
03/12/11 13:16:07	19980	13.09	2.37	0.45	0.00	4.45
03/12/11 13:16:37	20010	13.07	2.32	0.45	0.00	4.45
03/12/11 13:17:07	20040	13.08	2.31	0.43	0.00	4.46
03/12/11 13:17:37	20070	13.09	2.34	0.45	0.00	4.48
03/12/11 13:18:07	20100	13.11	2.33	0.37	0.00	4.47
03/12/11 13:18:37	20130	13.10	2.23	0.44	0.00	4.49
03/12/11 13:19:07	20160	13.10	2.19	0.44	0.00	4.48
03/12/11 13:19:37	20190	13.09	2.21	0.47	0.05	4.49
03/12/11 13:20:07	20220	13.08	2.15	0.41	0.00	4.51
03/12/11 13:20:37	20250	13.08	2.08	0.33	0.00	4.51
03/12/11 13:21:07	20280	13.10	2.10	0.42	0.00	4.52
03/12/11 13:21:37	20310	13.06	2.05	0.46	0.00	4.54
03/12/11 13:22:07	20340	13.05	2.06	0.50	0.00	4.55
03/12/11 13:22:37	20370	13.07	2.04	0.46	0.00	4.55
03/12/11 13:23:07	20400	13.10	1.97	0.55	0.00	4.53
03/12/11 13:23:37	20430	13.14	1.90	0.64	0.00	4.50
03/12/11 13:24:07	20460	13.13	1.79	0.70	0.00	4.51
03/12/11 13:24:37	20490	13.09	1.78	0.60	0.00	4.51
03/12/11 13:25:07	20520	13.10	1.85	0.52	0.00	4.52
03/12/11 13:25:37	20550	13.09	1.91	0.50	0.00	4.51
03/12/11 13:26:07	20580	13.10	1.97	0.57	0.00	4.51
03/12/11 13:26:37	20610	13.08	2.02	0.69	0.00	4.53
03/12/11 13:27:07	20640	13.07	2.09	0.63	0.00	4.52
03/12/11 13:27:37	20670	13.08	2.13	0.51	0.00	4.52
03/12/11 13:28:07	20700	13.10	2.12	0.47	0.00	4.48
03/12/11 13:28:37	20730	13.10	2.11	0.49	0.00	4.49
03/12/11 13:29:07	20760	13.11	2.08	0.43	0.00	4.49
03/12/11 13:29:37	20790	13.10	2.05	0.57	0.00	4.47
03/12/11 13:30:07	20820	13.10	2.05	0.45	0.00	4.49
03/12/11 13:30:37	20850	13.09	2.05	0.39	0.00	4.49
03/12/11 13:31:07	20880	13.10	2.06	0.42	0.00	4.49
03/12/11 13:31:37	20910	13.10	2.08	0.49	0.00	4.50
03/12/11 13:32:07	20940	13.09	2.06	0.43	0.00	4.48

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,576,145	SCFH

Weather Data

Barometric Pressure	30.26
Relative Humidity	42
Ambient Temperature	73
Specific Humidity	0.007150

Unit Data

Unit Load	252.6	megawatts
Heat Input	2,312	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	259	lb/hr
Meas. Stack Moisture	9.3	%
Stack Exhaust Flow (M19)	59,470,048	SCFH

Data from: Run 2 NH3

Base 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 (%)**
03/12/11 13:32:37	20970	13.07	2.05	0.47	0.00	4.50
03/12/11 13:33:07	21000	13.07	2.07	0.42	0.00	4.49
03/12/11 13:33:37	21030	13.08	2.06	0.37	0.00	4.49
03/12/11 13:34:07	21060	13.09	2.05	0.49	0.00	4.50
03/12/11 13:34:37	21090	13.08	2.04	0.46	0.00	4.49
03/12/11 13:35:07	21120	13.06	2.01	0.41	0.00	4.51
03/12/11 13:35:37	21150	13.03	2.08	0.45	0.00	4.52
03/12/11 13:36:07	21180	13.07	2.15	0.46	0.00	4.52
03/12/11 13:36:37	21210	13.08	2.10	0.49	0.00	4.50
RAW AVERAGE		**13.06**	**2.43**	**0.50**	**0.00**	**4.48**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	-0.01	0.02	-0.10	-0.01	0.24
	Final Zero	-0.05	-0.04	-0.10	0.00	0.38
	Avg. Zero	-0.03	-0.01	-0.10	-0.01	0.31
	Initial UpScale	12.06	5.10	4.80	2.77	9.02
	Final UpScale	12.06	5.11	4.73	2.87	9.20
	Avg. UpScale	12.06	5.11	4.77	2.82	9.11
Upscale Cal Gas		12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.11	2.35	0.61	0.01	4.22
Concentration (ppm@ 15%O_2)	N/A	1.78	0.46	0.01	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.73	0.45	0.01	N/A
Emission Rate (lb/hr)	N/A	16.71	2.63	0.03	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	73.21	11.51	0.11	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.000	N/A

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,847	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,570,955	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	40
Ambient Temperature	72
Specific Humidity	0.006573

Unit Data

Unit Load	251.2	megawatts
Heat Input	2,308	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	255	lb/hr
Meas. Stack Moisture	8.9	%
Stack Exhaust Flow (M19)	58,968,684	SCFH

Data from: Run 3 NH3

Base 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 (%)**
03/12/11 14:04:07	22860	13.04	2.64	0.56	0.00	4.51
03/12/11 14:04:37	22890	13.02	2.57	0.57	0.00	4.53
03/12/11 14:05:07	22920	13.01	2.67	0.46	0.00	4.53
03/12/11 14:05:37	22950	12.99	2.75	0.45	0.00	4.55
03/12/11 14:06:07	22980	12.99	2.86	0.45	0.00	4.54
03/12/11 14:06:37	23010	12.97	2.92	0.40	0.00	4.56
03/12/11 14:07:07	23040	12.97	2.96	0.41	0.05	4.55
03/12/11 14:07:37	23070	12.98	3.00	0.34	0.19	4.55
03/12/11 14:08:07	23100	12.99	2.96	0.36	0.05	4.56
03/12/11 14:08:37	23130	13.00	2.96	0.48	0.00	4.55
03/12/11 14:09:07	23160	13.02	2.86	0.48	0.11	4.55
03/12/11 14:09:37	23190	13.00	2.75	0.45	0.12	4.54
03/12/11 14:10:07	23220	12.94	2.76	0.45	0.00	4.59
03/12/11 14:10:37	23250	12.96	2.85	0.37	0.05	4.59
03/12/11 14:11:07	23280	12.97	2.85	0.42	0.22	4.57
03/12/11 14:11:37	23310	12.92	2.76	0.40	0.08	4.63
03/12/11 14:12:07	23340	12.99	2.76	0.44	0.00	4.59
03/12/11 14:12:37	23370	13.05	2.65	0.59	0.02	4.57
03/12/11 14:13:07	23400	13.00	2.47	0.69	0.15	4.58
03/12/11 14:13:37	23430	12.97	2.53	0.52	0.02	4.62
03/12/11 14:14:07	23460	13.01	2.61	0.56	0.08	4.60
03/12/11 14:14:37	23490	12.99	2.72	0.56	0.14	4.60
03/12/11 14:15:07	23520	12.98	2.82	0.54	0.00	4.63
03/12/11 14:15:37	23550	13.00	2.85	0.49	0.00	4.61
03/12/11 14:16:07	23580	13.01	2.89	0.51	0.04	4.61
03/12/11 14:16:37	23610	13.00	2.86	0.44	0.00	4.61
03/12/11 14:17:07	23640	13.00	2.90	0.42	0.00	4.62
03/12/11 14:17:37	23670	13.00	2.93	0.43	0.07	4.63
03/12/11 14:18:07	23700	12.99	2.97	0.41	0.00	4.63
03/12/11 14:18:37	23730	13.01	3.06	0.40	0.00	4.64
03/12/11 14:19:07	23760	13.01	3.05	0.41	0.12	4.62
03/12/11 14:19:37	23790	13.02	3.00	0.47	0.10	4.63
03/12/11 14:20:07	23820	13.02	2.92	0.47	0.00	4.61
03/12/11 14:20:37	23850	13.01	2.91	0.43	0.01	4.61
03/12/11 14:21:07	23880	13.02	2.94	0.43	0.17	4.61
03/12/11 14:21:37	23910	13.01	2.92	0.51	0.00	4.59
03/12/11 14:22:07	23940	13.02	2.92	0.46	0.00	4.60

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,847	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,570,955	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	40
Ambient Temperature	72
Specific Humidity	0.006573

Unit Data

Unit Load	251.2	megawatts
Heat Input	2,308	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	255	lb/hr
Meas. Stack Moisture	8.9	%
Stack Exhaust Flow (M19)	58,968,684	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/12/11 14:22:37	23970	13.03	2.83	0.50	0.15	4.58
03/12/11 14:23:07	24000	13.04	2.78	0.48	0.00	4.58
03/12/11 14:23:37	24030	13.03	2.72	0.47	0.00	4.57
03/12/11 14:24:07	24060	13.02	2.73	0.57	0.10	4.58
03/12/11 14:24:37	24090	13.02	2.77	0.49	0.00	4.59
03/12/11 14:25:07	24120	13.00	2.81	0.45	0.00	4.59
03/12/11 14:25:37	24150	12.99	2.87	0.40	0.13	4.62
03/12/11 14:26:07	24180	13.02	2.90	0.46	0.00	4.59
03/12/11 14:26:37	24210	13.01	2.78	0.56	0.00	4.59
03/12/11 14:27:07	24240	13.01	2.77	0.51	0.15	4.58
03/12/11 14:27:37	24270	13.00	2.81	0.48	0.14	4.59
03/12/11 14:28:07	24300	12.95	2.82	0.42	0.00	4.62
03/12/11 14:28:37	24330	12.96	2.97	0.29	0.10	4.62
03/12/11 14:29:07	24360	12.93	2.92	0.37	0.11	4.65
03/12/11 14:29:37	24390	13.01	2.88	0.36	0.00	4.61
03/12/11 14:30:07	24420	13.03	2.67	0.49	0.00	4.61
03/12/11 14:30:37	24450	13.04	2.46	0.61	0.13	4.61
03/12/11 14:31:07	24480	13.04	2.43	0.56	0.17	4.62
03/12/11 14:31:37	24510	13.00	2.46	0.55	0.04	4.65
03/12/11 14:32:07	24540	12.98	2.21	0.42	0.20	4.67
03/12/11 14:32:37	24570	12.95	2.11	0.45	0.18	4.69
03/12/11 14:33:07	24600	13.02	2.22	0.38	0.01	4.68
03/12/11 14:33:37	24630	13.06	2.18	0.51	0.12	4.65
03/12/11 14:34:07	24660	13.09	2.02	0.67	0.18	4.65
03/12/11 14:34:37	24690	13.04	1.99	0.58	0.03	4.65
03/12/11 14:35:07	24720	13.01	2.06	0.50	0.18	4.69
03/12/11 14:35:37	24750	13.02	2.14	0.41	0.29	4.69
03/12/11 14:36:07	24780	13.01	2.25	0.43	0.07	4.68
03/12/11 14:36:37	24810	13.00	2.28	0.38	0.07	4.70
03/12/11 14:37:07	24840	13.00	2.26	0.44	0.18	4.69
03/12/11 14:37:37	24870	13.08	2.24	0.48	0.03	4.67
03/12/11 14:38:07	24900	13.12	2.08	0.62	0.14	4.63
03/12/11 14:38:37	24930	13.03	1.94	0.69	0.13	4.66
03/12/11 14:39:07	24960	13.03	2.00	0.55	0.01	4.67
03/12/11 14:39:37	24990	13.02	2.06	0.51	0.14	4.66
03/12/11 14:40:07	25020	12.99	2.14	0.41	0.16	4.70
03/12/11 14:40:37	25050	12.98	2.18	0.42	0.00	4.70

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,847	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,570,955	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	40
Ambient Temperature	72
Specific Humidity	0.006573

Unit Data

Unit Load	251.2	megawatts
Heat Input	2,308	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	255	lb/hr
Meas. Stack Moisture	8.9	%
Stack Exhaust Flow (M19)	58,968,684	SCFH

Data from: Run 3 NH3

Base 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 (%)
03/12/11 14:41:07	25080	13.01	2.25	0.45	0.15	4.69
03/12/11 14:41:37	25110	13.07	2.23	0.50	0.13	4.66
03/12/11 14:42:07	25140	13.07	2.06	0.67	0.02	4.64
03/12/11 14:42:37	25170	13.06	1.97	0.66	0.28	4.65
03/12/11 14:43:07	25200	13.02	1.85	0.56	0.20	4.67
03/12/11 14:43:37	25230	13.03	1.87	0.43	0.04	4.66
03/12/11 14:44:07	25260	13.03	1.90	0.46	0.20	4.67
03/12/11 14:44:37	25290	13.02	1.93	0.52	0.22	4.67
03/12/11 14:45:07	25320	12.99	1.97	0.48	0.10	4.71
03/12/11 14:45:37	25350	13.00	2.03	0.39	0.30	4.70
03/12/11 14:46:07	25380	13.12	1.98	0.52	0.28	4.64
03/12/11 14:46:37	25410	13.15	1.81	0.73	0.16	4.62
03/12/11 14:47:07	25440	13.14	1.73	0.85	0.12	4.61
03/12/11 14:47:37	25470	13.11	1.74	0.64	0.17	4.61
03/12/11 14:48:07	25500	13.10	1.76	0.64	0.01	4.62
03/12/11 14:48:37	25530	13.12	1.81	0.66	0.08	4.59
03/12/11 14:49:07	25560	13.11	1.85	0.65	0.14	4.60
03/12/11 14:49:37	25590	13.09	1.89	0.52	0.02	4.60
03/12/11 14:50:07	25620	13.07	1.93	0.50	0.18	4.61
03/12/11 14:50:37	25650	13.05	1.98	0.46	0.18	4.62
03/12/11 14:51:07	25680	13.04	2.06	0.45	0.02	4.62
03/12/11 14:51:37	25710	13.03	2.11	0.42	0.08	4.64
03/12/11 14:52:07	25740	13.03	2.15	0.43	0.19	4.63
03/12/11 14:52:37	25770	13.06	2.14	0.42	0.04	4.62
03/12/11 14:53:07	25800	13.09	2.02	0.52	0.17	4.60
03/12/11 14:53:37	25830	13.08	1.88	0.47	0.17	4.59
03/12/11 14:54:07	25860	13.05	1.83	0.51	0.03	4.63
03/12/11 14:54:37	25890	12.97	1.83	0.46	0.18	4.67
03/12/11 14:55:07	25920	12.98	1.88	0.39	0.05	4.71
03/12/11 14:55:37	25950	13.07	1.83	0.48	0.15	4.66
03/12/11 14:56:07	25980	13.11	1.68	0.64	0.12	4.63
03/12/11 14:56:37	26010	13.11	1.59	0.62	0.00	4.64
03/12/11 14:57:07	26040	13.08	1.59	0.60	0.16	4.65
03/12/11 14:57:37	26070	13.03	1.67	0.56	0.09	4.66
03/12/11 14:58:07	26100	13.05	1.74	0.47	0.03	4.67
03/12/11 14:58:37	26130	13.06	1.79	0.41	0.17	4.66
03/12/11 14:59:07	26160	13.04	1.81	0.43	0.01	4.67

Florida Power and Light
March 12, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,642	SCF exh/MMBtu
Fuel Heating Value (HHV)	996	Btu/SCF fuel
Turbine Fuel Flow	1,847	lb/min
Duct Burner Fuel Flow	0	lb/min
Total Fuel Flow	2,570,955	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	40
Ambient Temperature	72
Specific Humidity	0.006573

Unit Data

Unit Load	251.2	megawatts
Heat Input	2,308	MMBtu/hr
Combustor Inlet Pressure	271	psig
NH_3 Injection Rate	255	lb/hr
Meas. Stack Moisture	8.9	%
Stack Exhaust Flow (M19)	58,968,684	SCFH

Data from: Run 3 NH3

Base 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 (%)**
03/12/11 14:59:37	26190	13.02	1.83	0.45	0.03	4.70
03/12/11 15:00:07	26220	13.07	1.84	0.37	0.16	4.66
03/12/11 15:00:37	26250	13.12	1.73	0.46	0.01	4.65
03/12/11 15:01:07	26280	13.15	1.64	0.66	0.06	4.61
03/12/11 15:01:37	26310	13.11	1.59	0.67	0.17	4.62
03/12/11 15:02:07	26340	13.07	1.64	0.60	0.02	4.66
03/12/11 15:02:37	26370	13.10	1.72	0.41	0.00	4.64
03/12/11 15:03:07	26400	13.10	1.77	0.55	0.18	4.64
03/12/11 15:03:37	26430	13.07	1.77	0.43	0.10	4.64
RAW AVERAGE		**13.03**	**2.34**	**0.49**	**0.09**	**4.62**

		O_2	**NOx**	**CO**	**VOC**	**CO_2**
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
Bias	**Initial Zero**	-0.05	-0.04	-0.10	0.00	0.38
	Final Zero	0.02	-0.03	-0.17	0.00	0.50
	Avg. Zero	-0.02	-0.04	-0.14	0.00	0.44
	Initial UpScale	12.06	5.11	4.73	2.87	9.20
	Final UpScale	12.09	5.10	4.76	3.14	9.36
	Avg. UpScale	12.08	5.11	4.75	3.01	9.28
Upscale Cal Gas		12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	13.05	2.28	0.63	0.09	4.22
Concentration (ppm@ 15%O_2)	N/A	1.72	0.48	0.07	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.66	0.46	0.07	N/A
Emission Rate (lb/hr)	N/A	16.07	2.72	0.23	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	70.39	11.90	0.99	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.001	0.000	N/A

TEST RESULTS

NOx, CO, VOC, CO_2, and O_2 Emissions
Base Load with Duct Burners

TABLE A.3

MITSUBISHI, 501G, UNIT 3C BASE W/DB LOAD DATA SUMMARY

Parameter	Base W/Db Load, Run - 2-1	Base W/Db Load, Run - 2-2	Base W/Db Load, Run - 2-3	Average
Date (mm/dd/yy)	03/13/11	03/13/11	03/13/11	03/13/11
Start Time (hh:mm:ss)	9:56:07	11:12:01	12:27:01	9:56:07
End Time (hh:mm:ss)	10:55:37	12:11:31	13:26:31	13:26:31
Run Duration (min / run)	60	60	60	60
Bar. Pressure (in. Hg)	30.28	30.30	30.30	30.29
Amb. Temp. (°F)	72	74	74	73
Rel. Humidity (%)	42	36	36	38
Spec. Humidity (lb water / lb air)	0.006905	0.006321	0.006321	0.006516
Load Designator	Base w/DB	Base w/DB	Base w/DB	Base w/DB
Comb. Inlet Pres. (psig)	274.0	273.2	271.8	273.0
NH3 Injection Rate (lb/hr)	278.1	274.5	272.5	275.0
Turbine Fuel Flow (lb/min)	1,872	1,862	1,851	1,861
Duct Burner Fuel Flow (lb/min)	159	159	159	159
Total Fuel Flow (SCFH)	2,826,831	2,812,535	2,796,666	2,812,011
Stack Flow (RM19) (SCFH)	59,509,130	59,263,252	59,183,490	59,318,624
Stack Moisture (% Method 4)	9.5	9.7	9.9	9.7
Heat Input (MMBtu/hr)	2,520.4	2,507.6	2,493.5	2,507.1
Power Output (megawatts)	254.9	253.9	251.8	253.5
NOx (ppmvd)	2.26	2.32	2.60	2.39
NOx (ppm@15%O_2)	1.57	1.61	1.82	1.67
NOx (ppm@15%O_2&ISO)	1.53	1.54	1.74	1.60
NOx (lb/hr)	16.06	16.41	18.39	16.95
NOx (ton/year) at 8760 hr/year	70.34	71.87	80.54	74.25
NOx (lb/MMBtu)	0.006	0.006	0.007	0.006
CO (ppmvd)	1.09	1.00	0.96	1.02
CO (ppm@15%O_2)	0.76	0.70	0.67	0.71
CO (ppm@15%O_2&ISO)	0.73	0.67	0.64	0.68
CO (lb/hr)	4.70	4.32	4.13	4.39
CO (ton/year) at 8760 hr/year	20.60	18.93	18.10	19.21
CO (lb/MMBtu)	0.002	0.002	0.001	0.002
VOC (ppmvd)	0.60	0.23	-0.03	0.27
VOC (ppm@15%O_2)	0.42	0.16	-0.02	0.19
VOC (ppm@15%O_2&ISO)	0.41	0.15	-0.02	0.18
VOC (lb/hr)	1.49	0.57	-0.06	0.67
VOC (ton/year) at 8760 hr/year	6.54	2.48	-0.28	2.91
VOC (lb/MMBtu)	0.001	0.000	0.000	0.000
Sulfur (gr S/100 scf)	<0.032	<0.032	<0.032	<0.032
NH_3 (ppmvd)	2.15	1.70	1.76	1.87
NH_3 (ppm@15%O_2)	1.50	1.18	1.23	1.30
Opacity (%)	0	0	0	0
CO_2 (%)	4.75	4.77	4.76	4.76
O_2 (%)	12.41	12.42	12.45	12.43

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,872	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,826,831	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	42
Ambient Temperature	72
Specific Humidity	0.006905

Unit Data

Unit Load	254.9	megawatts
Heat Input	2,520	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	278	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	59,509,130	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 09:56:01	11880	12.52	2.52	1.14	0.78	4.77
03/13/11 09:56:31	11910	12.50	2.43	1.04	0.81	4.72
03/13/11 09:57:01	11940	12.49	2.37	1.06	0.85	4.72
03/13/11 09:57:31	11970	12.50	2.38	1.13	0.72	4.72
03/13/11 09:58:01	12000	12.44	2.41	1.03	0.76	4.74
03/13/11 09:58:31	12030	12.45	2.55	0.99	0.79	4.74
03/13/11 09:59:01	12060	12.44	2.63	1.06	0.79	4.73
03/13/11 09:59:31	12090	12.44	2.64	0.96	0.75	4.73
03/13/11 10:00:01	12120	12.46	2.60	1.07	0.81	4.73
03/13/11 10:00:31	12150	12.50	2.50	1.14	0.81	4.70
03/13/11 10:01:01	12180	12.46	2.37	1.07	0.79	4.73
03/13/11 10:01:31	12210	12.42	2.35	1.08	0.83	4.74
03/13/11 10:02:01	12240	12.42	2.48	0.98	0.91	4.77
03/13/11 10:02:31	12270	12.48	2.51	1.12	0.81	4.74
03/13/11 10:03:01	12300	12.52	2.39	1.17	0.78	4.71
03/13/11 10:03:31	12330	12.52	2.28	1.23	0.83	4.73
03/13/11 10:04:01	12360	12.50	2.29	1.15	0.83	4.71
03/13/11 10:04:31	12390	12.45	2.37	1.02	0.79	4.74
03/13/11 10:05:01	12420	12.45	2.51	1.08	0.78	4.72
03/13/11 10:05:31	12450	12.47	2.60	1.07	0.80	4.73
03/13/11 10:06:01	12480	12.46	2.66	1.01	0.79	4.74
03/13/11 10:06:31	12510	12.44	2.70	1.04	0.80	4.75
03/13/11 10:07:01	12540	12.43	2.78	0.99	0.80	4.78
03/13/11 10:07:31	12570	12.46	2.71	0.95	0.03	4.75
03/13/11 10:08:01	12600	12.52	2.56	1.08	0.07	4.72
03/13/11 10:08:31	12630	12.54	2.37	1.17	0.01	4.72
03/13/11 10:09:01	12660	12.50	2.26	1.11	0.00	4.72
03/13/11 10:09:31	12690	12.52	2.33	1.18	0.10	4.73
03/13/11 10:10:01	12720	12.50	2.40	1.05	0.03	4.73
03/13/11 10:10:31	12750	12.49	2.54	0.96	0.00	4.74
03/13/11 10:11:01	12780	12.45	2.64	1.04	0.08	4.75
03/13/11 10:11:31	12810	12.45	2.72	0.99	0.03	4.75
03/13/11 10:12:01	12840	12.46	2.79	0.99	0.00	4.74
03/13/11 10:12:31	12870	12.49	2.70	1.05	0.01	4.71
03/13/11 10:13:01	12900	12.51	2.62	1.12	0.01	4.71
03/13/11 10:13:31	12930	12.50	2.56	1.03	0.00	4.70
03/13/11 10:14:01	12960	12.45	2.56	1.04	0.07	4.73

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,872	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,826,831	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	42
Ambient Temperature	72
Specific Humidity	0.006905

Unit Data

Unit Load	254.9	megawatts
Heat Input	2,520	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	278	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	59,509,130	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	**Elapsed Time (seconds)**	**O_2 (%)**	**NOx (ppmvd)**	**CO (ppmvd)**	**VOC (ppmvw)**	**CO_2 (%)**
03/13/11 10:14:31	12990	12.48	2.65	1.05	0.04	4.73
03/13/11 10:15:01	13020	12.48	2.68	1.13	0.01	4.71
03/13/11 10:15:31	13050	12.47	2.69	1.06	0.12	4.73
03/13/11 10:16:01	13080	12.43	2.64	1.13	0.03	4.74
03/13/11 10:16:31	13110	12.42	2.68	1.11	0.00	4.78
03/13/11 10:17:01	13140	12.42	2.72	1.06	0.07	4.79
03/13/11 10:17:31	13170	12.47	2.67	1.09	0.13	4.78
03/13/11 10:18:01	13200	12.51	2.46	1.18	0.02	4.78
03/13/11 10:18:31	13230	12.52	2.25	1.27	0.01	4.76
03/13/11 10:19:01	13260	12.49	2.19	1.23	0.13	4.79
03/13/11 10:19:31	13290	12.51	2.21	1.13	0.11	4.78
03/13/11 10:20:01	13320	12.46	2.29	1.19	0.07	4.80
03/13/11 10:20:31	13350	12.44	2.15	1.22	0.17	4.82
03/13/11 10:21:01	13380	12.43	2.05	1.32	1.38	4.82
03/13/11 10:21:31	13410	12.41	2.39	1.37	2.75	4.84
03/13/11 10:22:01	13440	12.38	2.59	1.33	2.28	4.83
03/13/11 10:22:31	13470	12.37	2.54	1.13	2.67	4.85
03/13/11 10:23:01	13500	12.38	2.47	1.08	2.57	4.85
03/13/11 10:23:31	13530	12.37	2.42	1.12	2.16	4.85
03/13/11 10:24:01	13560	12.43	2.41	1.10	2.27	4.83
03/13/11 10:24:31	13590	12.48	2.25	1.22	2.50	4.78
03/13/11 10:25:01	13620	12.47	2.06	1.19	2.00	4.77
03/13/11 10:25:31	13650	12.44	1.98	1.18	2.19	4.79
03/13/11 10:26:01	13680	12.41	2.04	1.10	2.27	4.80
03/13/11 10:26:31	13710	12.39	2.14	1.09	1.66	4.82
03/13/11 10:27:01	13740	12.40	2.21	1.13	1.50	4.79
03/13/11 10:27:31	13770	12.44	2.18	1.08	1.46	4.79
03/13/11 10:28:01	13800	12.45	2.09	1.03	1.10	4.77
03/13/11 10:28:31	13830	12.44	1.98	1.08	1.13	4.77
03/13/11 10:29:01	13860	12.41	1.95	1.15	1.15	4.79
03/13/11 10:29:31	13890	12.41	2.01	1.10	0.94	4.79
03/13/11 10:30:01	13920	12.43	2.03	1.09	1.03	4.80
03/13/11 10:30:31	13950	12.46	2.00	1.21	1.03	4.75
03/13/11 10:31:01	13980	12.47	1.91	1.16	0.77	4.76
03/13/11 10:31:31	14010	12.45	1.89	1.17	0.87	4.76
03/13/11 10:32:01	14040	12.44	1.89	1.16	0.78	4.77
03/13/11 10:32:31	14070	12.43	1.95	1.17	0.67	4.79

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,872	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,826,831	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	42
Ambient Temperature	72
Specific Humidity	0.006905

Unit Data

Unit Load	254.9	megawatts
Heat Input	2,520	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	278	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	59,509,130	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 10:33:01	14100	12.42	2.03	1.17	0.78	4.78
03/13/11 10:33:31	14130	12.43	2.05	1.14	0.73	4.79
03/13/11 10:34:01	14160	12.42	2.07	1.08	0.55	4.78
03/13/11 10:34:31	14190	12.45	2.06	1.10	0.71	4.78
03/13/11 10:35:01	14220	12.46	1.97	1.13	0.60	4.77
03/13/11 10:35:31	14250	12.44	1.90	1.12	0.53	4.76
03/13/11 10:36:01	14280	12.43	1.89	1.08	0.60	4.79
03/13/11 10:36:31	14310	12.43	1.98	1.12	0.52	4.78
03/13/11 10:37:01	14340	12.42	2.03	1.04	0.45	4.79
03/13/11 10:37:31	14370	12.44	2.06	1.08	0.53	4.79
03/13/11 10:38:01	14400	12.44	1.98	1.00	0.47	4.79
03/13/11 10:38:31	14430	12.43	1.88	1.10	0.44	4.80
03/13/11 10:39:01	14460	12.41	1.87	1.03	0.53	4.80
03/13/11 10:39:31	14490	12.45	1.91	0.98	0.44	4.78
03/13/11 10:40:01	14520	12.46	1.83	1.07	0.43	4.76
03/13/11 10:40:31	14550	12.44	1.74	1.06	0.55	4.79
03/13/11 10:41:01	14580	12.45	1.76	1.08	0.47	4.76
03/13/11 10:41:31	14610	12.45	1.78	1.05	0.34	4.76
03/13/11 10:42:01	14640	12.44	1.80	1.11	0.41	4.78
03/13/11 10:42:31	14670	12.41	1.81	1.06	0.41	4.78
03/13/11 10:43:01	14700	12.42	1.87	1.05	0.30	4.79
03/13/11 10:43:31	14730	12.42	1.88	1.06	0.46	4.78
03/13/11 10:44:01	14760	12.46	1.85	1.06	0.48	4.77
03/13/11 10:44:31	14790	12.45	1.79	1.11	0.42	4.77
03/13/11 10:45:01	14820	12.41	1.79	0.99	0.53	4.80
03/13/11 10:45:31	14850	12.36	1.86	1.02	0.41	4.84
03/13/11 10:46:01	14880	12.38	1.92	1.02	0.29	4.82
03/13/11 10:46:31	14910	12.42	1.97	1.12	0.27	4.81
03/13/11 10:47:01	14940	12.42	1.87	1.02	0.39	4.79
03/13/11 10:47:31	14970	12.47	1.81	1.11	0.32	4.77
03/13/11 10:48:01	15000	12.47	1.73	1.07	0.26	4.76
03/13/11 10:48:31	15030	12.47	1.71	1.13	0.31	4.76
03/13/11 10:49:01	15060	12.43	1.79	1.10	0.39	4.79
03/13/11 10:49:31	15090	12.42	1.90	1.04	0.26	4.79
03/13/11 10:50:01	15120	12.42	1.98	1.07	0.26	4.80
03/13/11 10:50:31	15150	12.44	2.07	1.00	0.37	4.79
03/13/11 10:51:01	15180	12.41	2.10	0.96	0.31	4.80

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,872	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,826,831	SCFH

Weather Data

Barometric Pressure	30.28
Relative Humidity	42
Ambient Temperature	72
Specific Humidity	0.006905

Unit Data

Unit Load	254.9	megawatts
Heat Input	2,520	MMBtu/hr
Combustor Inlet Pressure	274	psig
NH_3 Injection Rate	278	lb/hr
Meas. Stack Moisture	9.5	%
Stack Exhaust Flow (M19)	59,509,130	SCFH

Data from: Run 1 NH3

Base W/Db Load, Run - 2-1

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 10:51:31	15210	12.43	2.16	1.01	0.27	4.80
03/13/11 10:52:01	15240	12.43	2.19	0.99	0.39	4.79
03/13/11 10:52:31	15270	12.44	2.14	1.00	0.28	4.79
03/13/11 10:53:01	15300	12.45	2.10	1.04	0.25	4.77
03/13/11 10:53:31	15330	12.46	2.06	1.00	0.33	4.79
03/13/11 10:54:01	15360	12.44	2.08	1.04	0.39	4.80
03/13/11 10:54:31	15390	12.43	2.12	1.00	0.34	4.80
03/13/11 10:55:01	15420	12.42	2.18	0.97	0.25	4.82
03/13/11 10:55:31	15450	12.44	2.14	0.95	0.27	4.81
RAW AVERAGE		**12.45**	**2.22**	**1.09**	**0.65**	**4.77**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Bias	**Initial Zero**	0.00	-0.01	0.03	0.26	0.06
	Final Zero	0.09	-0.14	-0.11	0.12	0.12
	Avg. Zero	0.05	-0.08	-0.04	0.19	0.09
	Initial UpScale	12.11	4.99	5.07	2.76	8.92
	Final UpScale	12.17	4.87	5.06	2.69	8.82
	Avg. UpScale	12.14	4.93	5.07	2.73	8.87
Upscale Cal Gas		12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	**O_2**	**NOx**	**CO**	**VOC**	**CO_2**
Corrected Raw Average (ppm/% dry basis)	12.41	2.26	1.09	0.60	4.75
Concentration (ppm@ 15%O_2)	N/A	1.57	0.76	0.42	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.53	0.73	0.41	N/A
Emission Rate (lb/hr)	N/A	16.06	4.70	1.49	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	70.34	20.60	6.54	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.002	0.001	N/A

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,862	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,812,535	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	253.9	megawatts
Heat Input	2,508	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	274	lb/hr
Meas. Stack Moisture	9.7	%
Stack Exhaust Flow (M19)	59,263,252	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 11:12:01	16440	12.44	1.94	1.00	0.21	4.80
03/13/11 11:12:31	16470	12.43	2.02	1.06	0.23	4.82
03/13/11 11:13:01	16500	12.41	2.07	1.06	0.29	4.83
03/13/11 11:13:31	16530	12.43	2.11	0.93	0.22	4.81
03/13/11 11:14:01	16560	12.43	2.11	0.92	0.24	4.83
03/13/11 11:14:31	16590	12.46	2.02	0.96	0.26	4.80
03/13/11 11:15:01	16620	12.51	1.92	1.00	0.20	4.77
03/13/11 11:15:31	16650	12.49	1.78	1.05	0.27	4.77
03/13/11 11:16:01	16680	12.47	1.80	1.01	0.30	4.79
03/13/11 11:16:31	16710	12.46	1.85	1.01	0.20	4.80
03/13/11 11:17:01	16740	12.44	1.92	0.99	0.26	4.80
03/13/11 11:17:31	16770	12.45	2.00	1.01	0.27	4.82
03/13/11 11:18:01	16800	12.45	2.06	0.88	0.22	4.80
03/13/11 11:18:31	16830	12.45	2.10	0.94	0.21	4.82
03/13/11 11:19:01	16860	12.46	2.11	0.88	0.27	4.80
03/13/11 11:19:31	16890	12.47	2.07	0.96	0.17	4.80
03/13/11 11:20:01	16920	12.48	1.99	0.95	0.14	4.80
03/13/11 11:20:31	16950	12.48	1.91	0.96	0.26	4.79
03/13/11 11:21:01	16980	12.46	1.89	0.96	0.23	4.82
03/13/11 11:21:31	17010	12.46	1.91	0.97	0.20	4.81
03/13/11 11:22:01	17040	12.45	1.94	0.96	0.26	4.82
03/13/11 11:22:31	17070	12.47	1.95	0.96	0.24	4.83
03/13/11 11:23:01	17100	12.45	1.96	0.87	0.18	4.83
03/13/11 11:23:31	17130	12.47	2.00	0.97	0.30	4.85
03/13/11 11:24:01	17160	12.47	2.00	0.92	0.27	4.84
03/13/11 11:24:31	17190	12.47	1.99	0.93	0.21	4.86
03/13/11 11:25:01	17220	12.47	2.02	0.92	0.25	4.86
03/13/11 11:25:31	17250	12.47	2.03	0.96	0.21	4.84
03/13/11 11:26:01	17280	12.47	1.95	0.99	0.20	4.85
03/13/11 11:26:31	17310	12.49	1.94	0.88	0.28	4.83
03/13/11 11:27:01	17340	12.49	1.93	0.93	0.25	4.84
03/13/11 11:27:31	17370	12.49	1.94	0.94	0.25	4.83
03/13/11 11:28:01	17400	12.48	1.93	1.01	0.35	4.82
03/13/11 11:28:31	17430	12.46	1.93	0.92	0.21	4.84
03/13/11 11:29:01	17460	12.45	1.98	0.98	0.17	4.83
03/13/11 11:29:31	17490	12.46	2.03	0.95	0.24	4.85
03/13/11 11:30:01	17520	12.47	2.02	0.91	0.15	4.85

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,862	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,812,535	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	253.9	megawatts
Heat Input	2,508	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	274	lb/hr
Meas. Stack Moisture	9.7	%
Stack Exhaust Flow (M19)	59,263,252	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 11:30:31	17550	12.48	2.01	0.96	0.14	4.82
03/13/11 11:31:01	17580	12.49	1.98	0.96	0.28	4.83
03/13/11 11:31:31	17610	12.51	1.94	0.94	0.20	4.80
03/13/11 11:32:01	17640	12.49	1.92	0.94	0.17	4.82
03/13/11 11:32:31	17670	12.48	1.90	1.01	0.26	4.82
03/13/11 11:33:01	17700	12.49	1.92	0.93	0.22	4.81
03/13/11 11:33:31	17730	12.49	1.94	0.99	0.15	4.82
03/13/11 11:34:01	17760	12.47	1.94	0.92	0.25	4.81
03/13/11 11:34:31	17790	12.47	1.98	0.99	0.14	4.82
03/13/11 11:35:01	17820	12.49	2.00	0.97	0.24	4.82
03/13/11 11:35:31	17850	12.50	2.03	0.87	0.26	4.81
03/13/11 11:36:01	17880	12.48	2.17	0.92	0.14	4.83
03/13/11 11:36:31	17910	12.46	2.20	0.93	0.24	4.83
03/13/11 11:37:01	17940	12.46	2.25	0.96	0.26	4.83
03/13/11 11:37:31	17970	12.49	2.29	0.95	0.20	4.82
03/13/11 11:38:01	18000	12.51	2.20	0.97	0.33	4.80
03/13/11 11:38:31	18030	12.50	2.13	1.00	0.27	4.82
03/13/11 11:39:01	18060	12.51	2.12	0.92	0.30	4.80
03/13/11 11:39:31	18090	12.49	2.12	0.92	0.30	4.81
03/13/11 11:40:01	18120	12.48	2.19	0.87	0.18	4.82
03/13/11 11:40:31	18150	12.49	2.21	0.92	0.27	4.82
03/13/11 11:41:01	18180	12.47	2.25	0.87	0.27	4.84
03/13/11 11:41:31	18210	12.47	2.27	0.90	0.24	4.82
03/13/11 11:42:01	18240	12.47	2.24	0.90	0.26	4.84
03/13/11 11:42:31	18270	12.42	2.22	0.93	0.24	4.86
03/13/11 11:43:01	18300	12.45	2.20	0.90	0.18	4.85
03/13/11 11:43:31	18330	12.52	2.17	0.92	0.27	4.82
03/13/11 11:44:01	18360	12.52	2.04	1.01	0.26	4.78
03/13/11 11:44:31	18390	12.50	1.95	1.01	0.23	4.83
03/13/11 11:45:01	18420	12.46	1.99	0.91	0.38	4.83
03/13/11 11:45:31	18450	12.45	2.10	0.94	0.30	4.85
03/13/11 11:46:01	18480	12.46	2.19	0.90	0.41	4.86
03/13/11 11:46:31	18510	12.48	2.24	0.92	0.81	4.82
03/13/11 11:47:01	18540	12.47	2.19	0.98	1.14	4.83
03/13/11 11:47:31	18570	12.47	2.16	0.95	1.46	4.82
03/13/11 11:48:01	18600	12.46	2.16	1.00	1.39	4.83
03/13/11 11:48:31	18630	12.49	2.15	0.96	1.05	4.82

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,862	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,812,535	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	253.9	megawatts
Heat Input	2,508	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	274	lb/hr
Meas. Stack Moisture	9.7	%
Stack Exhaust Flow (M19)	59,263,252	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 11:49:01	18660	12.53	2.11	0.98	1.27	4.78
03/13/11 11:49:31	18690	12.52	1.98	1.01	1.15	4.80
03/13/11 11:50:01	18720	12.49	1.99	0.91	0.80	4.80
03/13/11 11:50:31	18750	12.48	2.09	0.93	0.99	4.82
03/13/11 11:51:01	18780	12.46	2.17	0.88	0.85	4.83
03/13/11 11:51:31	18810	12.46	2.26	0.83	0.74	4.83
03/13/11 11:52:01	18840	12.47	2.32	0.80	0.85	4.84
03/13/11 11:52:31	18870	12.50	2.31	0.88	0.67	4.82
03/13/11 11:53:01	18900	12.53	2.19	0.94	0.59	4.80
03/13/11 11:53:31	18930	12.53	2.00	0.96	0.71	4.80
03/13/11 11:54:01	18960	12.54	1.95	1.06	0.59	4.80
03/13/11 11:54:31	18990	12.54	2.11	0.88	0.54	4.80
03/13/11 11:55:01	19020	12.51	2.53	0.88	0.72	4.80
03/13/11 11:55:31	19050	12.53	2.68	0.91	0.65	4.81
03/13/11 11:56:01	19080	12.56	2.72	0.89	0.74	4.78
03/13/11 11:56:31	19110	12.57	2.63	0.86	0.82	4.77
03/13/11 11:57:01	19140	12.56	2.58	0.87	0.95	4.77
03/13/11 11:57:31	19170	12.57	2.57	0.91	0.68	4.76
03/13/11 11:58:01	19200	12.56	2.57	0.86	0.69	4.78
03/13/11 11:58:31	19230	12.56	2.55	0.88	0.65	4.77
03/13/11 11:59:01	19260	12.53	2.63	0.86	0.51	4.80
03/13/11 11:59:31	19290	12.54	2.72	0.79	0.60	4.79
03/13/11 12:00:01	19320	12.56	2.77	0.89	0.56	4.78
03/13/11 12:00:31	19350	12.56	2.71	0.91	0.41	4.79
03/13/11 12:01:01	19380	12.55	2.66	0.89	0.51	4.78
03/13/11 12:01:31	19410	12.55	2.67	0.86	0.52	4.79
03/13/11 12:02:01	19440	12.53	2.73	0.73	0.38	4.78
03/13/11 12:02:31	19470	12.56	2.70	0.85	0.47	4.79
03/13/11 12:03:01	19500	12.56	2.67	0.86	0.45	4.78
03/13/11 12:03:31	19530	12.53	2.64	0.97	0.38	4.79
03/13/11 12:04:01	19560	12.56	2.64	0.91	0.49	4.79
03/13/11 12:04:31	19590	12.55	2.57	0.88	0.39	4.77
03/13/11 12:05:01	19620	12.51	2.56	0.90	0.35	4.80
03/13/11 12:05:31	19650	12.50	2.68	0.84	0.41	4.81
03/13/11 12:06:01	19680	12.48	2.76	0.89	0.36	4.83
03/13/11 12:06:31	19710	12.52	2.77	0.82	0.35	4.81
03/13/11 12:07:01	19740	12.59	2.62	0.89	0.40	4.76

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,862	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,812,535	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	253.9	megawatts
Heat Input	2,508	MMBtu/hr
Combustor Inlet Pressure	273	psig
NH_3 Injection Rate	274	lb/hr
Meas. Stack Moisture	9.7	%
Stack Exhaust Flow (M19)	59,263,252	SCFH

Data from: Run 2 NH3

Base W/Db Load, Run - 2-2

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 12:07:31	19770	12.61	2.40	1.03	0.33	4.77
03/13/11 12:08:01	19800	12.57	2.36	1.02	0.35	4.77
03/13/11 12:08:31	19830	12.57	2.45	0.90	0.39	4.78
03/13/11 12:09:01	19860	12.56	2.57	0.92	0.28	4.78
03/13/11 12:09:31	19890	12.55	2.68	0.89	0.35	4.79
03/13/11 12:10:01	19920	12.55	2.76	0.80	0.41	4.79
03/13/11 12:10:31	19950	12.54	2.87	0.80	0.35	4.78
03/13/11 12:11:01	19980	12.52	2.96	0.85	0.29	4.81
03/13/11 12:11:31	20010	12.50	2.96	0.84	0.44	4.80
RAW AVERAGE		**12.50**	**2.22**	**0.93**	**0.41**	**4.81**

Bias

	O_2	NOx	CO	VOC	CO_2
Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
	(%)	(ppmvd)	(ppmvd)	(ppmvw)	(%)
Initial Zero	0.09	-0.14	-0.11	0.12	0.12
Final Zero	0.11	-0.10	-0.16	0.39	0.12
Avg. Zero	0.10	-0.12	-0.14	0.26	0.12
Initial UpScale	12.17	4.87	5.06	2.69	8.82
Final UpScale	12.19	4.86	5.09	2.73	8.94
Avg. UpScale	12.18	4.87	5.08	2.71	8.88
Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.42	2.32	1.00	0.23	4.77
Concentration (ppm@ 15%O_2)	N/A	1.61	0.70	0.16	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.54	0.67	0.15	N/A
Emission Rate (lb/hr)	N/A	16.41	4.32	0.57	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	71.87	18.93	2.48	N/A
Emission Rate (lb/MMBtu)	N/A	0.006	0.002	0.000	N/A

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,796,666	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	251.8	megawatts
Heat Input	2,493	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	272	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	59,183,490	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 12:27:01	20940	12.52	2.86	0.81	0.36	4.80
03/13/11 12:27:31	20970	12.55	2.82	0.76	0.29	4.79
03/13/11 12:28:01	21000	12.57	2.77	0.83	0.39	4.80
03/13/11 12:28:31	21030	12.56	2.66	0.85	0.32	4.78
03/13/11 12:29:01	21060	12.56	2.62	0.85	0.28	4.80
03/13/11 12:29:31	21090	12.57	2.58	0.81	0.39	4.79
03/13/11 12:30:01	21120	12.57	2.60	0.82	0.30	4.78
03/13/11 12:30:31	21150	12.59	2.56	0.89	0.33	4.79
03/13/11 12:31:01	21180	12.58	2.49	0.89	0.48	4.78
03/13/11 12:31:31	21210	12.56	2.53	0.79	0.40	4.81
03/13/11 12:32:01	21240	12.54	2.64	0.75	0.37	4.81
03/13/11 12:32:31	21270	12.55	2.76	0.74	0.51	4.82
03/13/11 12:33:01	21300	12.55	2.80	0.84	0.46	4.81
03/13/11 12:33:31	21330	12.57	2.73	0.87	0.36	4.79
03/13/11 12:34:01	21360	12.58	2.59	0.84	0.39	4.81
03/13/11 12:34:31	21390	12.59	2.47	0.90	0.45	4.79
03/13/11 12:35:01	21420	12.58	2.47	0.80	0.38	4.80
03/13/11 12:35:31	21450	12.57	2.49	0.79	0.31	4.82
03/13/11 12:36:01	21480	12.55	2.56	0.76	0.49	4.82
03/13/11 12:36:31	21510	12.54	2.66	0.78	0.44	4.84
03/13/11 12:37:01	21540	12.52	2.78	0.72	0.53	4.84
03/13/11 12:37:31	21570	12.52	2.87	0.82	0.53	4.85
03/13/11 12:38:01	21600	12.55	2.81	0.83	0.41	4.82
03/13/11 12:38:31	21630	12.55	2.73	0.87	0.38	4.82
03/13/11 12:39:01	21660	12.61	2.58	0.82	0.46	4.80
03/13/11 12:39:31	21690	12.62	2.42	0.86	0.39	4.79
03/13/11 12:40:01	21720	12.60	2.37	0.90	0.34	4.81
03/13/11 12:40:31	21750	12.58	2.49	0.88	0.41	4.81
03/13/11 12:41:01	21780	12.57	2.60	0.86	0.39	4.82
03/13/11 12:41:31	21810	12.54	2.77	0.85	0.29	4.84
03/13/11 12:42:01	21840	12.53	2.84	0.83	0.34	4.83
03/13/11 12:42:31	21870	12.53	2.90	0.82	0.39	4.85
03/13/11 12:43:01	21900	12.55	2.99	0.78	0.37	4.82
03/13/11 12:43:31	21930	12.57	2.84	0.80	0.29	4.82
03/13/11 12:44:01	21960	12.56	2.69	0.83	0.43	4.81
03/13/11 12:44:31	21990	12.54	2.60	0.85	0.36	4.84
03/13/11 12:45:01	22020	12.54	2.64	0.80	0.29	4.85

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,796,666	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	251.8	megawatts
Heat Input	2,493	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	272	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	59,183,490	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 12:45:31	22050	12.59	2.60	0.93	0.43	4.81
03/13/11 12:46:01	22080	12.60	2.48	0.97	0.38	4.81
03/13/11 12:46:31	22110	12.58	2.37	0.95	0.29	4.81
03/13/11 12:47:01	22140	12.57	2.46	0.89	0.28	4.82
03/13/11 12:47:31	22170	12.56	2.53	0.95	0.42	4.84
03/13/11 12:48:01	22200	12.54	2.67	0.84	0.40	4.83
03/13/11 12:48:31	22230	12.55	2.72	0.85	0.29	4.84
03/13/11 12:49:01	22260	12.54	2.78	0.79	0.29	4.84
03/13/11 12:49:31	22290	12.56	2.90	0.70	0.39	4.84
03/13/11 12:50:01	22320	12.60	2.87	0.78	0.31	4.83
03/13/11 12:50:31	22350	12.59	2.74	0.85	0.30	4.81
03/13/11 12:51:01	22380	12.55	2.66	0.91	0.42	4.84
03/13/11 12:51:31	22410	12.54	2.72	0.74	0.40	4.84
03/13/11 12:52:01	22440	12.52	2.86	0.80	0.27	4.87
03/13/11 12:52:31	22470	12.54	2.91	0.75	0.27	4.87
03/13/11 12:53:01	22500	12.55	2.88	0.80	0.39	4.86
03/13/11 12:53:31	22530	12.55	2.73	0.83	0.33	4.87
03/13/11 12:54:01	22560	12.60	2.64	0.82	0.32	4.85
03/13/11 12:54:31	22590	12.58	2.48	0.87	0.39	4.85
03/13/11 12:55:01	22620	12.53	2.44	0.87	0.33	4.89
03/13/11 12:55:31	22650	12.53	2.54	0.79	0.33	4.89
03/13/11 12:56:01	22680	12.53	2.62	0.90	0.39	4.90
03/13/11 12:56:31	22710	12.58	2.66	0.88	0.34	4.89
03/13/11 12:57:01	22740	12.62	2.63	0.90	0.32	4.85
03/13/11 12:57:31	22770	12.60	2.51	0.88	0.38	4.86
03/13/11 12:58:01	22800	12.59	2.60	0.92	0.30	4.84
03/13/11 12:58:31	22830	12.60	2.73	0.86	0.32	4.85
03/13/11 12:59:01	22860	12.58	2.83	0.81	0.47	4.86
03/13/11 12:59:31	22890	12.57	2.89	0.82	0.39	4.85
03/13/11 13:00:01	22920	12.56	2.97	0.87	0.36	4.87
03/13/11 13:00:31	22950	12.55	3.08	0.72	0.41	4.85
03/13/11 13:01:01	22980	12.58	3.07	0.68	0.00	4.83
03/13/11 13:01:31	23010	12.61	2.92	0.78	0.00	4.83
03/13/11 13:02:01	23040	12.60	2.72	0.79	0.00	4.81
03/13/11 13:02:31	23070	12.60	2.64	0.78	0.00	4.83
03/13/11 13:03:01	23100	12.56	2.62	0.84	0.00	4.84
03/13/11 13:03:31	23130	12.53	2.78	0.72	0.00	4.86

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,796,666	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	251.8	megawatts
Heat Input	2,493	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	272	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	59,183,490	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 13:04:01	23160	12.54	2.92	0.73	0.00	4.87
03/13/11 13:04:31	23190	12.62	2.85	0.83	0.00	4.81
03/13/11 13:05:01	23220	12.64	2.64	0.92	0.00	4.81
03/13/11 13:05:31	23250	12.64	2.49	0.98	0.00	4.80
03/13/11 13:06:01	23280	12.61	2.46	0.91	0.00	4.81
03/13/11 13:06:31	23310	12.59	2.50	0.85	0.00	4.83
03/13/11 13:07:01	23340	12.54	2.64	0.77	0.00	4.84
03/13/11 13:07:31	23370	12.50	2.72	0.86	0.00	4.90
03/13/11 13:08:01	23400	12.49	2.43	0.88	0.00	4.89
03/13/11 13:08:31	23430	12.50	2.39	0.87	0.00	4.89
03/13/11 13:09:01	23460	12.51	2.33	0.84	0.00	4.89
03/13/11 13:09:31	23490	12.52	2.18	0.83	0.08	4.87
03/13/11 13:10:01	23520	12.52	2.10	0.96	0.06	4.88
03/13/11 13:10:31	23550	12.50	2.11	0.83	0.00	4.88
03/13/11 13:11:01	23580	12.46	2.13	0.90	0.03	4.90
03/13/11 13:11:31	23610	12.47	2.21	0.87	0.09	4.92
03/13/11 13:12:01	23640	12.51	2.21	0.88	0.00	4.88
03/13/11 13:12:31	23670	12.52	2.09	0.87	0.00	4.88
03/13/11 13:13:01	23700	12.46	1.95	0.96	0.09	4.90
03/13/11 13:13:31	23730	12.45	2.01	0.88	0.01	4.91
03/13/11 13:14:01	23760	12.45	2.09	0.85	0.02	4.92
03/13/11 13:14:31	23790	12.49	2.06	0.91	0.52	4.88
03/13/11 13:15:01	23820	12.51	2.00	0.91	0.68	4.89
03/13/11 13:15:31	23850	12.50	1.97	0.91	0.68	4.89
03/13/11 13:16:01	23880	12.52	1.95	0.94	0.92	4.87
03/13/11 13:16:31	23910	12.53	2.02	0.94	0.81	4.94
03/13/11 13:17:01	23940	12.50	2.07	0.89	0.58	4.94
03/13/11 13:17:31	23970	12.49	2.14	0.86	0.54	4.90
03/13/11 13:18:01	24000	12.49	2.17	0.86	0.64	4.89
03/13/11 13:18:31	24030	12.47	2.22	0.89	0.37	4.90
03/13/11 13:19:01	24060	12.43	2.25	0.83	0.24	4.93
03/13/11 13:19:31	24090	12.49	2.27	0.85	0.35	4.90
03/13/11 13:20:01	24120	12.54	2.15	0.94	0.29	4.88
03/13/11 13:20:31	24150	12.54	1.99	0.99	0.11	4.87
03/13/11 13:21:01	24180	12.51	1.93	0.92	0.18	4.88
03/13/11 13:21:31	24210	12.51	1.99	0.83	0.15	4.88
03/13/11 13:22:01	24240	12.49	2.09	0.78	0.03	4.88

Florida Power and Light
March 13, 2011
Mitsubishi, 501G, Unit 3C
West County Energy Center

Fuel Data

Fuel Fd factor	8,640	SCF exh/MMBtu
Fuel Heating Value (HHV)	990	Btu/SCF fuel
Turbine Fuel Flow	1,851	lb/min
Duct Burner Fuel Flow	159	lb/min
Total Fuel Flow	2,796,666	SCFH

Weather Data

Barometric Pressure	30.30
Relative Humidity	36
Ambient Temperature	74
Specific Humidity	0.006321

Unit Data

Unit Load	251.8	megawatts
Heat Input	2,493	MMBtu/hr
Combustor Inlet Pressure	272	psig
NH_3 Injection Rate	272	lb/hr
Meas. Stack Moisture	9.9	%
Stack Exhaust Flow (M19)	59,183,490	SCFH

Data from: Run 3 NH3

Base W/Db Load, Run - 2-3

Date/Time (mm/dd/yy hh:mm:ss)	Elapsed Time (seconds)	O_2 (%)	NOx (ppmvd)	CO (ppmvd)	VOC (ppmvw)	CO_2 (%)
03/13/11 13:22:31	24270	12.47	2.20	0.88	0.13	4.91
03/13/11 13:23:01	24300	12.45	2.28	0.89	0.01	4.90
03/13/11 13:23:31	24330	12.44	2.36	0.89	0.02	4.92
03/13/11 13:24:01	24360	12.45	2.41	0.91	0.03	4.91
03/13/11 13:24:31	24390	12.50	2.33	0.93	0.00	4.88
03/13/11 13:25:01	24420	12.50	2.14	0.92	0.00	4.89
03/13/11 13:25:31	24450	12.50	2.03	0.92	0.00	4.87
03/13/11 13:26:01	24480	12.47	1.97	1.02	0.00	4.89
03/13/11 13:26:31	24510	12.47	1.97	0.96	0.03	4.89
RAW AVERAGE		**12.54**	**2.51**	**0.85**	**0.27**	**4.85**

		O_2	NOx	CO	VOC	CO_2
	Serial Number:	INST-N2-0001	INST-N2-0001	INST-CO-0015	INST-TH-0001	INST-C2-0009
		(%)	**(ppmvd)**	**(ppmvd)**	**(ppmvw)**	**(%)**
	Initial Zero	0.11	-0.10	-0.16	0.39	0.12
	Final Zero	0.11	-0.14	-0.19	0.26	0.16
Bias	**Avg. Zero**	0.11	-0.12	-0.18	0.33	0.14
	Initial UpScale	12.19	4.86	5.09	2.73	8.94
	Final UpScale	12.19	4.87	5.07	2.65	8.99
	Avg. UpScale	12.19	4.87	5.08	2.69	8.97
Upscale Cal Gas		12.10	4.93	4.92	2.89	8.91

EMISSIONS DATA	O_2	NOx	CO	VOC	CO_2
Corrected Raw Average (ppm/% dry basis)	12.45	2.60	0.96	-0.03	4.76
Concentration (ppm@ 15%O_2)	N/A	1.82	0.67	-0.02	N/A
Concentration (ppm@ 15%O_2 &ISO)	N/A	1.74	0.64	-0.02	N/A
Emission Rate (lb/hr)	N/A	18.39	4.13	-0.06	N/A
Emission Rate (tons/year) at 8760 hr/yr	N/A	80.54	18.10	-0.28	N/A
Emission Rate (lb/MMBtu)	N/A	0.007	0.001	0.000	N/A

TEST RESULTS

NH_3 Emissions
Base Load

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3C
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/12/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3C	
Base Run Number		Base	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		1	2	3	
Test Date	(mm/dd/yy)	03/12/11	03/12/11	03/12/11	
Load	% or w/DB	Base	Base	Base	
Fuel F-Factor		8641.62	8641.62	8641.62	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	$(\Delta H_@)$	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

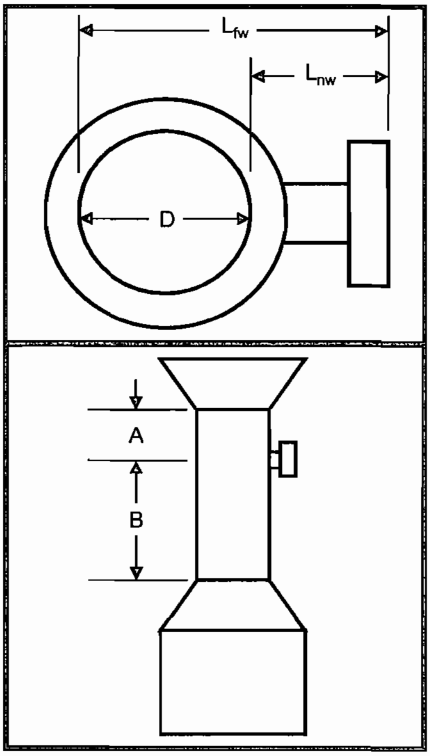
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/12/11
Sampling Location	Unit 3C	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²

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[1] 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

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

● Method 1 Tra ○ 12 Point PM Trav ○ Veloci

Location of Traverse Points in Circular Stacks									
Traverse	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	.854	.250	.146	.105	.082	.067	.057	.049	044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	.342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	.296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center			
Sampling Location	Unit 3C			
Operator	TG			
Project #	bv-10-westcounty.fl-comp#2			
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/12/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft²
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.23	%vd
Oxygen Concentration	(%O_2)	13.09	%vd
Carbon Monoxide Concentration	(ppmCO)	0.62	ppmvd
Nitrogen Concentration	(%N_2)	82.68	%vd
Stack Moisture Content	(B_{ws})	9.07	%
Stack Dry Molecular Weight	(M_d)	29.20	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.18	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	68.99	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	62,056,578	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	1,034,276	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,566,084	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	68,246,539	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):
If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number	Base-V1			
Run Time	09:00	**Start**	09:43	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(i)}$)
	in H_2O	deg	°F	ft/sec
A-1	0.77	0	271	58.30
A-2	0.85	0	274	61.37
A-3	0.91	0	272	63.42
A-4	0.89	0	270	62.63
A-5	0.77	0	269	58.22
A-6	0.62	0	267	52.17
B-1	0.85	0	281	61.67
B-2	0.98	0	280	66.17
B-3	0.98	0	279	66.13
B-4	0.95	0	278	65.06
B-5	0.88	0	278	62.62
B-6	0.85	0	277	61.50
C-1	1.10	0	285	70.34
C-2	1.30	0	282	76.31
C-3	1.40	0	281	79.14
C-4	1.40	0	280	79.09
C-5	1.40	0	278	78.98
C-6	1.00	0	274	66.57
D-1	1.10	0	286	70.39
D-2	1.40	0	278	78.98
D-3	1.50	0	276	81.64
D-4	1.50	0	275	81.59
D-5	1.60	0	275	84.26
D-6	1.10	0	266	69.44
Average	1.09	0	276	
	1.03	= Square roots of Δp		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/12/11		
Sampling Location	Unit 3C	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data

Run Number	Base-1		**Run Start Time**		11:05	**Run Stop Time**	12:20	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:15	4.2	13.1	0.6	82.6	29.20	1.835	150.9	YES

Gas Analysis Data

Run Number	Base-2		**Run Start Time**		12:37	**Run Stop Time**	13:53	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:16	4.2	13.1	0.6	82.7	29.20	1.846	150.4	NO

Gas Analysis Data

Run Number	Base-3		**Run Start Time**		14:03	**Run Stop Time**	15:17	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	(%CO_2)	(%O_2)	(ppmCO)	(%N_2)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:14	4.2	13.1	0.6	82.7	29.20	1.860	148.5	NO

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/12/11
Sampling Location	Unit 3C	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data									
Run Number		Base-1		**Run Start Time**		11:05	**Run Stop Time**		12:20
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	46.880	dcf	**Barometric Pressure**		(P_b)	30.28	in Hg
Average Stack Temp		$(t_s)_{avg}$	276	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	85	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.98	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	804.00	769.80	612.60	801.40				
Initial Value	$(V_i),(W_i)$	745.50	748.10	608.00	790.20				
Net Value	$(V_n),(W_n)$	58.5	21.7	4.6	11.2				
Results									
Total Weight		(W_t)	96.00	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.526	scf
Std Meter Volume		$(V_{m(std)})$	45.763	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.00	%	**Final Moisture Content**		(B_{ws})	9.00	%

Moisture Content Data									
Run Number		Base-2		**Run Start Time**		12:37	**Run Stop Time**		13:53
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	45.200	dcf	**Barometric Pressure**		(P_b)	30.26	in Hg
Average Stack Temp		$(t_s)_{avg}$	276	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	87	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.85	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	823.90	771.20	619.90	868.80				
Initial Value	$(V_i),(W_i)$	769.80	749.40	613.40	856.20				
Net Value	$(V_n),(W_n)$	54.1	21.8	6.5	12.6				
Results									
Total Weight		(W_t)	95.00	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.479	scf
Std Meter Volume		$(V_{m(std)})$	43.908	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.26	%	**Final Moisture Content**		(B_{ws})	9.26	%

Moisture Content Data									
Run Number		Base-3		**Run Start Time**		14:03	**Run Stop Time**		15:17
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	45.440	dcf	**Barometric Pressure**		(P_b)	30.28	in Hg
Average Stack Temp		$(t_s)_{avg}$	270	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	88	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.83	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	811.50	732.00	612.00	799.40				
Initial Value	$(V_i),(W_i)$	746.00	718.30	609.30	789.50				
Net Value	$(V_n),(W_n)$	65.5	13.7	2.7	9.9				
Results									
Total Weight		(W_t)	91.80	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.328	scf
Std Meter Volume		$(V_{m(std)})$	44.086	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	8.94	%	**Final Moisture Content**		(B_{ws})	8.94	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/12/11
Operator	TG
Run Number	Base-1

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	276.3	°F
Average Meter Temp	(t_m)	85.1	
Orifice Meter Coefficient	(ΔH@)	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	1.03	in H_2O
Stack Moisture Content	(B_{ws})	9.00	%
Stack Dry Molecular Weight	(M_d)	29.20	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.85	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	4.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2140	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.28	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.34	in Hg
Absolute Meter Pressure	(P_m)	30.41	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	11:05	**End**	12:20

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	745.5	748.1	608.0	790.2				
Post	804.0	769.8	612.6	801.4				

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Meter Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH_d)	Actual Orifice ΔH (ΔH_a)	Stack Temp (t_s)	Probe Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (≤68°F)	Cond. Temp (≤–°F)	CPM Filter Temp (–±–°F)	Meter Inlet Temp (t_{mi})	Meter Outlet Temp (t_{mo})	Pump Vacuum	Square Root ΔP $(\Delta p^{1/2})$	Local Stack Velocity $(v_s)_i$	Cumul. Meter Volume $(V_m)_{std}$	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume $(V_m)_{std}$
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	134.200	0.77	1.428	1.40	271	246	263	67			82	85	1.0	0.88	58.26	1.740	103.6	41.765
A-2	2.5	00:02:30	135.980	0.85	1.576	1.60	274	248	252	67			83	85	1.0	0.92	61.33	3.421	99.6	41.052
A-3	5.0	00:05:00	137.700	0.91	1.688	1.70	272	251	265	67			84	84	1.0	0.95	63.37	5.161	98.2	41.287
A-4	7.5	00:07:30	139.480	0.89	1.651	1.60	270	252	266	66			86	85	1.0	0.94	62.59	6.915	97.9	41.490
A-5	10.0	00:10:00	141.280	0.77	1.428	1.40	269	247	264	66			86	85	1.0	0.88	58.18	8.483	97.1	40.719
A-6	12.5	00:12:30	142.890	0.62	1.150	1.10	267	245	263	62			85	84	1.0	0.79	52.13	9.985	97.4	39.940
B-1	15.0	00:15:00	144.430	0.85	1.576	1.60	281	249	273	66			83	84	1.0	0.92	61.62	11.677	97.3	40.035
B-2	17.5	00:17:30	146.160	0.98	1.818	1.70	280	243	259	63			86	84	1.0	0.99	66.13	13.443	96.8	40.329
B-3	20.0	00:20:00	147.970	0.98	1.818	1.80	279	248	265	61			87	83	1.0	0.99	66.08	15.297	97.0	40.792
B-4	22.5	00:22:30	149.870	0.95	1.762	1.70	278	247	256	61			87	83	1.0	0.97	65.02	17.034	96.7	40.881
B-5	25.0	00:25:00	151.650	0.88	1.632	1.60	278	243	258	62			86	83	1.0	0.94	62.58	18.742	96.6	40.892
B-6	27.5	00:27:30	153.400	0.85	1.576	1.60	277	245	257	62			86	84	1.0	0.92	61.46	20.449	96.6	40.899
C-1	30.0	00:30:00	155.150	1.10	2.040	2.00	285	248	263	65			85	84	2.0	1.05	70.29	22.355	96.6	41.271
C-2	32.5	00:32:30	157.100	1.30	2.411	2.40	282	253	263	58			88	84	2.0	1.14	76.26	24.306	96.0	41.667
C-3	35.0	00:35:00	159.100	1.40	2.597	2.60	281	252	263	54			89	83	2.0	1.18	79.09	26.590	96.5	42.544
C-4	37.5	00:37:30	161.440	1.40	2.597	2.60	280	252	260	52			89	83	2.0	1.18	79.03	28.835	96.8	43.252
C-5	40.0	00:40:00	163.740	1.40	2.597	2.60	278	249	260	54			87	84	2.0	1.18	78.93	31.062	96.9	43.852
C-6	42.5	00:42:30	166.020	1.00	1.855	1.80	274	254	265	54			88	84	1.0	1.00	66.52	32.932	97.0	43.909
D-1	45.0	00:45:00	167.940	1.10	2.040	2.00	286	248	255	57			87	84	2.0	1.05	70.34	34.766	96.7	43.915
D-2	47.5	00:47:30	169.820	1.40	2.500	2.50	278	248	250	53			87	84	2.0	1.18	78.93	36.895	96.6	44.274
D-3	50.0	00:50:00	172.000	1.50	2.782	2.70	276	248	266	53			87	84	2.0	1.22	81.59	39.045	96.3	44.623
D-4	52.5	00:52:30	174.200	1.50	2.782	2.70	275	248	246	54			86	84	2.0	1.22	81.53	41.421	96.6	45.187
D-5	55.0	00:55:00	176.630	1.60	2.967	2.90	275	248	263	56			88	84	2.0	1.26	84.21	43.707	96.5	45.607
D-6	57.5	00:57:30	178.970	1.10	2.040	2.00	266	250	254	56			87	84	1.0	1.05	69.39	45.765	96.8	45.765
Last Pt	60.0	01:00:00	181.080																	
Final Val	60.0	01:00:00	181.080											**Max Vac**	2.0	**Final Values**		45.765	96.8	
Average Values				1.09		1.98	276	248	260	60			86	84		1.03	68.95			
													85							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/12/11
Operator	TG
Run Number	Base-2

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	276.0	°F
Average Meter Temp	(t_m)	87.2	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}_{avg}$)	1.00	in H_2O
Stack Moisture Content	(B_{ws})	9.26	%
Stack Dry Molecular Weight	(M_d)	29.20	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.76	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.85	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	4.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2173	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Pressures			
Barometric Pressure	(P_b)	30.28	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.32	in Hg
Absolute Meter Pressure	(P_m)	30.39	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	12:37	**End**	13:53

Weights	Imp 1	Imp 2	Imp 3	Imp 4	Imp 5	Imp 6	Imp 7	Imp 8
Pre	769.8	749.4	613.4	856.2				
Post	823.9	771.2	619.9	868.8				

Wash Volumes					ml
					ml

Traverse Point #	Sampling Time (Θ)	Timer Time	Dry Gas Reading (V_m)	Velocity Head (Δp)	Desired Orifice ΔH (ΔH_d)	Actual Orifice ΔH (ΔH_a)	Stack Temp (t_s)	Probe Temp (248±25°F)	Filter Temp (248±25°F)	Impinger Exit Temp (≤68°F)	Cond. Temp (≤–°F)	CPM Filter Temp (–±–°F)	Meter Inlet Temp (t_{mi})	Meter Outlet Temp (t_{mo})	Pump Vacuum	Square Root ΔP ($\Delta p^{1/2}$)	Local Stack Velocity $(v_s)_i$	Cumul. Meter Volume $(V_m)_{std}$	Cumul. Percent IsoKinetic (I)	Est-Run Meter Volume $(V_m)_{std}$
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	181.330	0.99	1.836	1.80	275	246	253	68			83	83	1.0	0.99	66.30	1.801	95.1	43.225
A-2	2.5	00:02:30	183.170	1.10	2.040	2.00	276	245	258	65			84	83	1.0	1.05	69.93	3.870	94.4	44.038
A-3	5.0	00:05:00	185.080	1.10	2.040	2.00	273	248	257	60			87	83	1.0	1.05	69.79	5.680	96.6	45.438
A-4	7.5	00:07:30	187.140	1.50	2.781	2.70	272	249	250	59			87	83	2.0	1.22	81.44	8.094	98.6	48.563
A-5	10.0	00:10:00	189.610	1.50	2.781	2.70	271	245	257	60			89	83	2.0	1.22	81.38	10.133	96.3	48.638
A-6	12.5	00:12:30	191.700	1.10	2.040	2.00	267	243	258	62			89	83	1.0	1.05	69.50	12.090	96.5	48.362
B-1	15.0	00:15:00	193.710	1.20	2.225	2.20	279	252	266	65			87	84	1.0	1.10	73.19	14.041	96.1	48.141
B-2	17.5	00:17:30	195.710	1.00	1.854	1.80	282	252	260	61			89	86	1.0	1.00	66.95	16.507	101.2	49.521
B-3	20.0	00:20:00	198.250	1.40	2.596	2.60	282	251	258	60			91	85	1.0	1.18	79.21	17.838	98.1	47.569
B-4	22.5	00:22:30	199.620	1.40	2.596	2.60	282	252	262	60			90	85	1.0	1.18	79.21	20.007	97.9	48.017
B-5	25.0	00:25:00	201.850	1.60	2.967	2.90	279	248	261	61			93	86	2.0	1.26	84.51	22.354	97.9	48.773
B-6	27.5	00:27:30	204.270	1.30	2.410	2.30	276	253	261	61			93	86	1.0	1.14	76.02	24.456	97.8	48.911
C-1	30.0	00:30:00	206.440	0.82	1.520	1.50	283	256	267	66			93	89	1.0	0.91	60.66	26.114	97.8	48.210
C-2	32.5	00:32:30	208.160	0.91	1.687	1.70	280	249	263	64			95	90	1.0	0.95	63.78	27.864	97.7	47.767
C-3	35.0	00:35:00	209.980	0.90	1.669	1.60	279	252	265	61			94	89	1.0	0.95	63.38	29.540	97.4	47.264
C-4	37.5	00:37:30	211.720	0.83	1.539	1.50	279	249	263	61			92	89	1.0	0.91	60.87	31.373	97.9	47.060
C-5	40.0	00:40:00	213.620	0.72	1.335	1.30	278	248	260	62			89	89	1.0	0.85	56.65	32.766	97.4	46.258
C-6	42.5	00:42:30	215.060	0.50	0.927	0.90	273	251	267	62			87	88	1.0	0.71	47.05	34.180	97.8	45.573
D-1	45.0	00:45:00	216.520	0.71	1.316	1.30	276	246	266	67			86	87	1.0	0.84	56.18	35.822	98.0	45.248
D-2	47.5	00:47:30	218.210	0.80	1.483	1.50	274	244	262	66			87	86	1.0	0.89	59.56	37.503	98.0	45.004
D-3	50.0	00:50:00	219.940	0.82	1.520	1.50	273	245	259	65			87	86	1.0	0.91	60.25	39.505	98.9	45.149
D-4	52.5	00:52:30	222.000	0.61	1.502	1.50	273	250	266	64			86	85	1.0	0.90	59.89	40.868	98.3	44.583
D-5	55.0	00:55:00	223.400	0.74	1.372	1.30	272	248	252	64			85	85	1.0	0.86	57.20	42.495	98.3	44.342
D-6	57.5	00:57:30	225.070	0.58	1.075	1.10	269	239	258	63			86	84	1.0	0.76	50.54	43.916	98.3	43.916
Last Pt	60.0	01:00:00	226.530																	
Final Val	60.0	01:00:00	226.530											Max Vac	2.0	Final Values		43.916	98.3	
Average Values				1.01		1.85	276	248	260	63			89	86		1.00	66.39			
													87							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/12/11
Operator	TG
Run Number	Base-3

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	270.4	°F
Average Meter Temp	(t_m)	88.2	
Orifice Meter Coefficient	(ΔH@)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.99	in H_2O
Stack Moisture Content	(B_{ws})	8.94	%
Stack Dry Molecular Weight	(M_d)	29.20	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.88	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	4.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2127	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Pressures			
Barometric Pressure	(P_b)	30.28	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.34	in Hg
Absolute Meter Pressure	(P_m)	30.41	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Run Time			
Start	14:03	**End**	15:17

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	746.0	718.3	609.3	789.5				
Post	811.5	732.0	612.0	799.4				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity ($(v_s)_i$)**	**Cumul. Meter Volume ($(V_m)_{std}$)**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume ($(V_m)_{std}$)**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	226.820	0.72	1.355	1.30	275	247	257	68			85	84	1.0	0.85	56.49	1.541	95.1	36.995
A-2	2.5	00:02:30	228.400	0.85	1.600	1.60	275	248	260	64			86	84	1.0	0.92	61.37	3.287	97.3	39.449
A-3	5.0	00:05:00	230.190	0.84	1.581	1.50	273	241	250	60			87	84	1.0	0.92	60.93	5.031	98.1	40.251
A-4	7.5	00:07:30	231.980	0.80	1.506	1.50	272	245	260	60			89	85	1.0	0.89	59.42	6.605	96.6	39.633
A-5	10.0	00:10:00	233.600	0.74	1.393	1.40	271	249	251	59			90	84	1.0	0.86	57.11	8.208	96.7	39.399
A-6	12.5	00:12:30	235.250	0.55	1.035	1.00	268	253	267	58			93	85	1.0	0.74	49.13	9.591	96.8	38.363
B-1	15.0	00:15:00	236.680	0.78	1.468	1.40	284	246	254	67			89	87	1.0	0.88	59.15	11.162	96.4	38.268
B-2	17.5	00:17:30	238.300	0.88	1.657	1.60	282	248	262	64			89	87	1.0	0.94	62.74	12.840	96.1	38.520
B-3	20.0	00:20:00	240.030	0.89	1.675	1.60	281	251	258	63			89	87	1.0	0.94	63.06	14.557	96.0	38.818
B-4	22.5	00:22:30	241.800	0.89	1.675	1.60	280	247	261	64			90	88	1.0	0.94	63.01	16.203	95.6	38.887
B-5	25.0	00:25:00	243.500	0.79	1.487	1.50	279	248	258	65			90	87	1.0	0.89	59.33	17.976	96.5	39.221
B-6	27.5	00:27:30	245.330	0.62	1.167	1.10	276	245	261	65			92	87	1.0	0.79	52.45	19.435	96.5	38.871
C-1	30.0	00:30:00	246.840	0.98	1.845	1.80	289	251	251	67			89	89	1.0	0.99	66.52	21.218	96.4	39.171
C-2	32.5	00:32:30	248.680	1.20	2.259	2.20	285	249	266	64			90	87	1.0	1.10	73.42	23.285	96.7	39.917
C-3	35.0	00:35:00	250.810	1.20	2.259	2.20	282	251	261	64			89	87	1.0	1.10	73.27	25.238	96.5	40.381
C-4	37.5	00:37:30	252.820	1.40	2.635	2.60	271	253	263	65			90	87	2.0	1.18	78.55	27.725	97.7	41.587
C-5	40.0	00:40:00	255.380	1.20	2.259	2.20	263	253	259	66			91	87	2.0	1.10	72.32	29.519	96.9	41.674
C-6	42.5	00:42:30	257.230	1.30	2.447	2.40	261	254	281	65			92	87	2.0	1.14	75.17	31.632	98.8	42.176
D-1	45.0	00:45:00	259.410	0.93	1.751	1.70	261	255	264	62			87	87	2.0	0.96	63.58	33.741	97.9	42.621
D-2	47.5	00:47:30	261.580	1.20	2.259	2.20	260	251	264	61			91	87	2.0	1.10	72.17	35.826	97.9	42.992
D-3	50.0	00:50:00	263.730	1.40	2.635	2.60	257	248	257	62			92	88	2.0	1.18	77.79	38.229	98.4	43.690
D-4	52.5	00:52:30	266.210	1.40	2.635	2.60	252	251	251	64			92	88	2.0	1.18	77.52	40.186	97.7	43.840
D-5	55.0	00:55:00	268.230	1.20	2.259	2.20	249	251	260	64			92	88	2.0	1.10	71.62	42.190	97.6	44.024
D-6	57.5	00:57:30	270.300	1.10	2.071	2.00	244	249	262	65			92	88	1.0	1.05	68.33	44.086	97.4	44.086
Last Pt	60.0	01:00:00	272.260																	
Final Val	60.0		272.260											Max Vac	2.0	Final Values		44.086	97.4	
Average Values				0.99		1.83	270	249	259	64			90	87		0.99	65.60			
													88							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/12/11
Sampling Location	Unit 3C	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data				
Run Number	Base-1	Base-2	Base-3	
Run Start Time	11:05	12:37	14:03	(hh:mm)
Run Stop Time	12:20	13:53	15:17	(hh:mm)
Train Prepared By	JF	JF	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/12/11	03/12/11	03/12/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/12/11	03/12/11	03/12/11	(mm/dd/yy)
Relinquished Time	12:20	13:53	15:17	(hh:mm)

Equipment Identification Numbers			
Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data					
Impingers 1, 2, and 3 - Liquid Weight					
Final Weight	(W_f)	2186.4	2215.0	2155.5	g
Initial Weight	(W_i)	2101.6	2132.6	2073.6	g
Net Weight	(W_n)	84.8	82.4	81.9	g
Comments					
Impinger 4 - Silica Gel Weight					
Final Weight	(W_f)	801.4	868.8	799.4	g
Initial Weight	(W_i)	790.2	856.2	789.5	g
Net Weight	(W_n)	11.2	12.6	9.9	g
Comments					
Total Water Collected					
Total Weight	(W_{lc})	96.0	95.0	91.8	g
Total Volume	(V_{lc})	96.2	95.2	92.0	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Run Start Time	11:05	12:37	14:03		hh:mm
Run Stop Time	12:20	13:53	15:17		hh:mm
Test Date	03/12/11	03/12/11	03/12/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Initial Meter Volume	134.200	181.330	226.820		ft^3
Final Meter Volume	181.080	226.530	272.260		ft^3
Total Meter Volume	46.880	45.200	45.440	45.840	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	85.08	87.21	88.23	86.84	°F
Average Stack Temperature	276.33	275.96	270.42	274.24	°F
Barometric Pressure	30.28	30.26	30.28	30.27	in Hg
Stack Static Pressure	0.75	0.75	0.75	0.75	in H_2O
Absolute Stack Pressure	30.34	30.32	30.34	30.33	in Hg
Average Orifice Pressure Drop	1.98	1.85	1.83	1.88	in H_2O
Absolute Meter Pressure	30.41	30.39	30.41	30.40	in Hg
Avg Square Root Pitot Pressure	1.03	1.00	0.99	1.01	$\sqrt{(\text{in } H_2O)}$
Moisture Content Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Impinger Water Weight Gain	84.80	82.40	81.90	83.03	g
Silica Gel Weight Gain	11.20	12.60	9.90	11.23	g
Total Water Volume Collected	96.17	95.17	91.97	94.44	ml
Standard Water Vapor Volume	4.53	4.48	4.33	4.44	scf
Standard Meter Volume	45.8	43.9	44.1	44.6	dscf
Calculated Stack Moisture	9.00	9.26	8.94	9.07	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	9.00	9.26	8.94	9.07	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Carbon Dioxide Content	4.2	4.2	4.2	4.2	%
Oxygen Content	13.1	13.1	13.1	13.1	%
Carbon Monoxide Content	0.6	0.6	0.6	0.6	ppm
Nitrogen Content	82.6	82.7	82.7	82.7	%
Stack Dry Molecular Weight	29.20	29.20	29.20	29.20	lb/lb-mole
Stack Wet Molecular Weight	28.19	28.16	28.20	28.18	lb/lb-mole
Calculated Fuel Factor	1.835	1.846	1.860	1.847	
Fuel F-Factor	8641.62	8641.62	8641.62	8641.62	dscf/MMBtu
Percent Excess Air	150.9	150.4	148.5	149.9	%
Volumetric Flow Rate Data	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Average Stack Gas Velocity	68.95	66.39	65.60	66.98	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,565,282	1,507,185	1,489,256	1,520,574	acfm
Wet Standard Stack Flow Rate	68,279	65,735	65,489	66,501	wkscfh
Dry Standard Stack Flow Rate	62,133,472	59,649,839	59,634,105	60,472,472	dscfh
Percent of Isokinetic Rate	96.8	98.3	97.4	97.5	%
Ammonia Analysis (CTM-027)	**Base-1**	**Base-2**	**Base-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3C-R1-FH	U3C-R2-FH	U3C-R3-FH		
Lab Log Number (Back Half)	U3C-R1-BH	U3C-R2-BH	U3C-R3-BH		
Front Half Results (C_f)	10.3000	10.2000	15.0000	11.8333	mg/l
Back Half Results (C_b)	0.2020	0.0292	0.2010	0.1441	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	200	210	190	200	ml
Back Half Sample Volume	180	180	160	173	ml
Volume of NH_3	0.00276	0.00282	0.00379	0.00312	L
NH_3 Concentration	2.13	2.27	3.04	2.48	ppmvd
NH_3 Concentration	1.61	1.72	2.28	1.87	ppm@15%O_2

TEST RESULTS

NH_3 Emissions
Base Load with Duct Burners

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE

Source Information	
Plant Name	West County Energy Center
Sampling Location	Unit 3C
Fuel Type	Gas, Natural

Test Information			
Project #		bv-10-westcounty.fl-comp#2	
Operator		TG	
Date for Preliminary Run	(mm/dd/yy)	03/12/11	
Standard Temperature		68	°F
Standard Pressure		29.92	in Hg
Required Sample Vol.	indust. spec.	35	scf
Run Duration	chk Subpart	60	minutes
Unit Number		3C	
Base Run Number		Base w/DB	
Number of Ports Available		4	
Number of Ports Used		4	
Port Inside Diameter		6.00	in
Stack Shape		Circular	

Test Equipment Information					
Run		**1**	**2**	**3**	
Test Date	(mm/dd/yy)	03/13/11	03/13/11	03/13/11	
Load	% or w/DB	Base w/DB	Base w/DB	Base w/DB	
Fuel F-Factor		8639.90	8639.90	8639.90	dscf/MMBtu
Meter Box Number	from ACS	SAMP-CP-0010	SAMP-CP-0010	SAMP-CP-0010	
Meter Calibration Factor	(Y)	0.991	0.991	0.991	
Orifice Meter Coefficient	($\Delta H_@$)	1.745	1.745	1.745	in H_2O
Pitot Identification	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Pitot Tube Coefficient	(C_p)	0.840	0.840	0.840	
Nozzle Number	from ACS	I8	I8	I8	
Nozzle Diameter	(D_n)	0.230	0.230	0.230	in
Probe Number	from ACS	SAMP-HP-0001	SAMP-HP-0001	SAMP-HP-0001	
Probe Length		120.0	120.0	120.0	in
(SS, Glass ....) Liner Material	from list	inconel	inconel	inconel	
Sample Case / Oven Number	from ACS	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025	
Impinger Case Number	from ACS	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021	

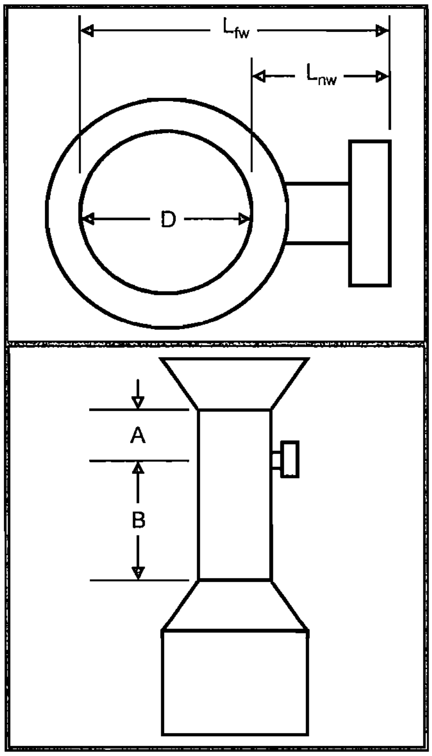
Testing Company Information	
Company Name	Air Hygiene International, Inc. (Tulsa, Oklahoma)
Address	5634 S. 122nd East Avenue, Suite F
City, State Zip	Tulsa, Oklahoma 74146
Project Manager	Jake Fahlenkamp
Phone Number	(918) 307-8865
Fax Number	(918) 307-9131

METHOD 1 - SAMPLE AND VELOCITY TRAVERSES FOR CIRCULAR SOURCES

Plant Name	West County Energy Center	**Date**	03/12/11
Sampling Location	Unit 3C	**Stack Type**	Circular
Operator	TG	**Ports Available**	4
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4
Stack Size	Large (>24 inch diameter)	**Port ID (inches)**	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	ft²

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[1] 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

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

● Method 1 Tra ○ 12 Point PM Trav ○ Veloci

Location of Traverse Points in Circular Stacks									
Traverse	(Fraction of Stack Dimension from Inside Wall to Traverse Point)								
Point	**Number of Traverse Points Across the Stack**								
Number	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**
1	.146	.067	.044	.032	.026	.021	.018	.016	.014
2	854	.250	.146	.105	.082	067	.057	049	.044
3		.750	.296	.194	.146	.118	.099	.085	.075
4		.933	.704	.323	.226	.177	.146	.125	.109
5			.854	.677	342	.250	.201	.169	.146
6			.956	.806	.658	.356	.269	.220	.188
7				.895	.774	.644	.366	.283	.236
8				.968	.854	.750	.634	.375	296
9					.918	.823	.731	.625	.382
10					.974	.882	.799	.717	.618
11						.933	.854	.780	.704
12						.979	.901	.831	.764

Traverse Point Locations			
Traverse Point Number	**Fraction of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
		in	in
1	0.021	5 4/8	24 4/8
2	0.067	17 5/8	36 5/8
3	0.118	31 1/8	50 1/8
4	0.177	46 5/8	65 5/8
5	0.250	65 7/8	84 7/8
6	0.356	93 6/8	112 6/8
7			
8			
9			

METHOD 2 - DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant Name	West County Energy Center		
Sampling Location	Unit 3C		
Operator	TG		
Project #	bv-10-westcounty.fl-comp#2		
Pitot Leak Check	x	**PreTest**	x	**PostTest**

Date	03/12/11
Stack Type	Circular
Ports Available	4
Pitot Identification	SAMP-HP-0001
Pitot Coefficient	0.840

Stack Dimensions			
Area of Stack	(A_s)	378.35	ft²
Diameter of Stack	(D)	263.38	in

Pressures			
Barometric Pressure	(P_b)	30.25	in Hg
Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.31	in Hg

Stack Gas Composition			
Composition Data:	**Actual Composition**		
Carbon Dioxide Concentration	(%CO_2)	4.76	%vd
Oxygen Concentration	(%O_2)	12.43	%vd
Carbon Monoxide Concentration	(ppmCO)	1.02	ppmvd
Nitrogen Concentration	(%N_2)	82.81	%vd
Stack Moisture Content	(B_{ws})	9.71	%
Stack Dry Molecular Weight	(M_d)	29.26	lb/lb-mole
Stack Wet Molecular Weight	(M_w)	28.17	lb/lb-mole

Results			
Avg Stack Gas Velocity	(v_s)	69.01	ft/sec
Avg Stack Dry Std Flow Rate	(Q_{sd})	61,640,529	dscf/hr
Avg Stack Dry Std Flow Rate	(Q_{sd})	1,027,342	dscf/min
Avg Stack Wet Flow Rate	(Q_{aw})	1,566,611	acf/min
Avg Stack Wet Std Flow Rate	(Q_{sw})	68,269,497	ascf/hr

40 CFR 60, Method 2G, Section 8.11.1 (but applies to all Method 2 type static pressure measurements):
If a Type S probe is used for this measurement, position the probe at or between any traverse point(s) and rotate the probe until a null differential pressure reading is obtained. Disconnect the tubing from one of the pressure ports; read and record the ΔP. For pressure devices with one-directional scales, if a deflection in the positive direction is noted with the negative side disconnected, then the static pressure is positive. Likewise, if a deflection in the positive direction is noted with the positive side disconnected, then the static pressure is negative.

Stack Cross Section Schematic

Velocity Traverse Data				
Run Number	Base w/DB-V1			
Run Time	09:00	**Start**	09:43	**End**
Traverse Point	**Velocity Head** (Δp)	**Null Angle** (N_a)	**Stack Temp** (t_s)	**Local Velocity** ($v_{s(i)}$)
	in H_2O	deg	°F	ft/sec
A-1	0.77	0	271	58.32
A-2	0.85	0	274	61.40
A-3	0.91	0	272	63.44
A-4	0.89	0	270	62.65
A-5	0.77	0	269	58.24
A-6	0.62	0	267	52.18
B-1	0.85	0	281	61.69
B-2	0.98	0	280	66.19
B-3	0.98	0	279	66.15
B-4	0.95	0	278	65.08
B-5	0.88	0	278	62.64
B-6	0.85	0	277	61.52
C-1	1.10	0	285	70.36
C-2	1.30	0	282	76.34
C-3	1.40	0	281	79.17
C-4	1.40	0	280	79.11
C-5	1.40	0	278	79.01
C-6	1.00	0	274	66.59
D-1	1.10	0	286	70.41
D-2	1.40	0	278	79.01
D-3	1.50	0	276	81.67
D-4	1.50	0	275	81.61
D-5	1.60	0	275	84.29
D-6	1.10	0	266	69.46
Average	1.09	0	276	
	1.03	**= Square roots of Δp**		

METHOD 3a - DETERMINATION OF DRY MOLECULAR WEIGHT BY ANALYZER

Plant Name	West County Energy Center	**Date**	03/13/11		
Sampling Location	Unit 3C	**Operator**	TG		
Project #	bv-10-westcounty.fl-comp#2	**# of Ports Used**	1 (gas probe)		
Fuel Type	Gas, Natural	**Min. Fuel Factor**	1.600	**Max. Fuel Factor**	1.836

Gas Analysis Data

Run Number	Base w/DB-1		**Run Start Time**	09:55	**Run Stop Time**	11:08	
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:13	4.8	12.4	1.1	82.8	29.26	1.787	131.2	YES

Gas Analysis Data

Run Number	Base w/DB-2		**Run Start Time**	11:23	**Run Stop Time**	12:35		
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:12	4.8	12.4	1.0	82.8	29.26	1.778	131.5	YES

Gas Analysis Data

Run Number	Base w/DB-3		**Run Start Time**	12:52	**Run Stop Time**	14:05		
Sample Analysis Time	**CO_2 Conc.**	**O_2 Conc.**	**CO Conc.**	**N_2 Conc.**	**Dry Molecular Weight**	**Calculated Fuel Factor**	**Excess Air**	**Fuel Factor in Range**
	($\%CO_2$)	($\%O_2$)	(ppmCO)	($\%N_2$)	(M_d)	$(F_o)_{avg}$	$(\%EA)_{avg}$	
hh:mm	%	%	ppm	%	lb/lb-mole		%	
01:13	4.8	12.5	1.0	82.8	29.26	1.775	132.4	YES

METHOD 4 - DETERMINATION OF MOISTURE CONTENT IN STACK GASES

Plant Name	West County Energy Center	**Date**	03/13/11
Sampling Location	Unit 3C	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2	**Ports Used**	4

Moisture Content Data									
Run Number		Base w/DB-1		**Run Start Time**		09:55	**Run Stop Time**		11:08
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	44.050	dcf	**Barometric Pressure**		(P_b)	30.23	in Hg
Average Stack Temp		$(t_s)_{avg}$	242	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	82	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.72	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	835.60	751.50	619.60	858.70				
Initial Value	$(V_i),(W_i)$	770.00	733.30	615.10	850.50				
Net Value	$(V_n),(W_n)$	65.6	18.2	4.5	8.2				
Results									
Total Weight		(W_t)	96.50	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.550	scf
Std Meter Volume		$(V_{m(std)})$	43.170	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.53	%	**Final Moisture Content**		(B_{ws})	9.53	%

Moisture Content Data									
Run Number		Base w/DB-2		**Run Start Time**		11:23	**Run Stop Time**		12:35
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	44.680	dcf	**Barometric Pressure**		(P_b)	30.30	in Hg
Average Stack Temp		$(t_s)_{avg}$	219	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	80	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.71	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	782.90	763.50	612.60	813.60				
Initial Value	$(V_i),(W_i)$	720.80	743.10	607.40	801.40				
Net Value	$(V_n),(W_n)$	62.1	20.4	5.2	12.2				
Results									
Total Weight		(W_t)	99.90	g	**Water Vol Weighed**		$(V_{wsg(std)})$	4.710	scf
Std Meter Volume		$(V_{m(std)})$	44.027	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.66	%	**Final Moisture Content**		(B_{ws})	9.66	%

Moisture Content Data									
Run Number		Base w/DB-3		**Run Start Time**		12:52	**Run Stop Time**		14:05
Meter Box Number		SAMP-CP-0010			**Meter Cal Factor**		(Y)	0.991	
Total Meter Volume		(V_m)	46.320	dcf	**Barometric Pressure**		(P_b)	30.30	in Hg
Average Stack Temp		$(t_s)_{avg}$	223	°F	**Stack Static Pressure**		(P_{static})	0.75	in H_2O
Average Meter Temp		$(t_m)_{avg}$	81	°F	**Avg Orifice Pressure**		$(\Delta H)_{avg}$	1.91	in H_2O
		Impinger 1	**Impinger 2**	**Impinger 3**	**Impinger 4**	**Impinger 5**	**Impinger 6**	**Impinger 7**	**Impinger 8**
		(g)	(g)	(g)	(g)				
Contents		H_2SO_4	H_2SO_4	-	Sil Gel				
Final Value	$(V_f),(W_f)$	812.10	756.50	618.50	881.80				
Initial Value	$(V_i),(W_i)$	740.60	737.60	614.80	869.20				
Net Value	$(V_n),(W_n)$	71.5	18.9	3.7	12.6				
Results									
Total Weight		(W_t)	106.70	g	**Water Vol Weighed**		$(V_{wsg(std)})$	5.031	scf
Std Meter Volume		$(V_{m(std)})$	45.622	dscf	**Sat. Moisture Content**		$(B_{ws(svp)})$	100.00	%
Calc Moisture Content		$(B_{ws(calc)})$	9.93	%	**Final Moisture Content**		(B_{ws})	9.93	%

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/13/11
Operator	TG
Run Number	Base w/DB-1

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	09:55	**End**	11:08

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2157	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	242.1	°F
Average Meter Temp	(t_m)	81.7	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.97	in H_2O
Stack Moisture Content	(B_{ws})	9.53	%
Stack Dry Molecular Weight	(M_d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.75	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.91	

Pressures			
Barometric Pressure	(P_b)	30.23	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.29	in Hg
Absolute Meter Pressure	(P_m)	30.36	in Hg

Weights	*Imp 1*	*Imp 2*	*Imp 3*	*Imp 4*	*Imp 5*	*Imp 6*	*Imp 7*	*Imp 8*
Pre	770.0	733.3	615.1	850.5				
Post	835.6	751.5	619.6	858.7				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)$_i$**	**Cumul. Meter Volume (V_m)$_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)$_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	272.530	0.81	1.551	1.50	252	255	262	63			79	82	1.0	0.90	59.03	1.816	104.7	43.587
A-2	2.5	00:02:30	274.380	0.81	1.551	1.50	253	249	258	61			81	83	1.0	0.90	59.07	3.373	97.9	40.472
A-3	5.0	00:05:00	275.970	0.89	1.704	1.60	256	251	262	59			81	81	1.0	0.94	62.05	5.462	104.5	43.698
A-4	7.5	00:07:30	278.100	0.79	1.513	1.40	252	248	256	58			83	81	1.0	0.89	58.30	6.735	98.8	40.407
A-5	10.0	00:10:00	279.400	0.75	1.436	1.30	254	248	257	60			83	81	1.0	0.87	56.88	8.202	96.9	39.371
A-6	12.5	00:12:30	280.900	0.51	0.977	0.93	248	252	259	61			83	81	1.0	0.71	46.71	9.581	97.3	38.323
B-1	15.0	00:15:00	282.310	0.71	1.359	1.30	246	248	262	68			83	81	1.0	0.84	55.03	11.039	96.3	37.847
B-2	17.5	00:17:30	283.800	0.84	1.608	1.50	250	251	264	67			86	81	1.0	0.92	60.03	12.776	96.6	38.329
B-3	20.0	00:20:00	285.580	0.82	1.570	1.50	246	249	261	66			87	81	1.0	0.91	59.14	14.425	96.3	38.466
B-4	22.5	00:22:30	287.270	0.84	1.608	1.50	244	248	261	67			87	82	1.0	0.92	59.77	16.081	96.0	38.595
B-5	25.0	00:25:00	288.970	0.70	1.340	1.20	242	246	259	67			86	81	1.0	0.84	54.49	17.603	95.8	38.407
B-6	27.5	00:27:30	290.530	0.43	0.823	0.76	236	248	257	87			84	81	1.0	0.66	42.52	18.872	96.0	37.745
C-1	30.0	00:30:00	291.830	0.92	1.762	1.70	245	257	255	64			81	81	1.0	1.00	62.60	20.639	95.9	38.102
C-2	32.5	00:32:30	293.630	1.10	2.106	2.00	242	254	256	59			81	80	1.0	1.05	68.30	22.585	95.9	38.717
C-3	35.0	00:35:00	295.610	1.30	2.489	2.40	238	255	257	55			82	80	1.0	1.14	74.04	24.718	95.9	39.548
C-4	37.5	00:37:30	297.780	1.40	2.681	2.60	236	251	259	51			82	80	2.0	1.18	76.73	26.901	95.8	40.351
C-5	40.0	00:40:00	300.000	1.40	2.681	2.60	233	251	255	50			82	79	2.0	1.18	76.56	29.165	96.0	41.174
C-6	42.5	00:42:30	302.300	0.88	1.685	1.60	227	252	256	50			84	80	1.0	0.94	60.44	30.957	96.1	41.276
D-1	45.0	00:45:00	304.130	1.00	1.915	1.80	243	249	256	86			81	79	1.0	1.00	65.17	32.845	96.2	41.488
D-2	47.5	00:47:30	306.050	1.10	2.106	2.00	240	249	257	83			83	79	1.0	1.05	68.21	34.779	96.1	41.735
D-3	50.0	00:50:00	308.020	1.20	2.298	2.20	235	256	254	63			82	80	2.0	1.10	70.99	36.852	96.1	42.117
D-4	52.5	00:52:30	310.130	1.30	2.489	2.40	233	253	255	63			82	79	2.0	1.14	73.78	39.085	96.4	42.638
D-5	55.0	00:55:00	312.400	1.30	2.489	2.40	232	252	257	63			84	79	2.0	1.14	73.72	41.344	96.7	43.141
D-6	57.5	00:57:30	314.700	0.96	1.838	1.70	227	259	255	64			84	79	1.0	0.98	63.12	43.187	96.6	43.187
Last Pt	60.0	01:00:00	316.580																	
Final Val	60.0	01:00:00	316.580											**Max Vac**	2.0	**Final Values**		43.187	96.6	
Average Values				0.95		1.72	242	251	258	61			83	80		0.97	62.78			
													82							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/13/11
Operator	TG
Run Number	Base w/DB-2

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	219.2	°F
Average Meter Temp	(t_m)	80.0	
Orifice Meter Coefficient	$(\Delta H@)$	1.745	in H_2O
Square Root ΔP	$(\Delta p^{1/2}{}_{avg})$	0.94	in H_2O
Stack Moisture Content	(B_{ws})	9.66	%
Stack Dry Molecular Weight	(M_d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.72	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.97	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2116	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0020		

Pressures			
Barometric Pressure	(P_b)	30.30	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.36	in Hg
Absolute Meter Pressure	(P_m)	30.43	in Hg

Nozzle Measurements				
Pre	0.230	0.230	0.230	PASS
Post	0.230	0.230	0.230	PASS

Run Time			
Start	11:23	**End**	12:35

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	720.8	743.1	607.4	801.4				
Post	782.9	763.5	612.6	813.6				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤–°F)**	**CPM Filter Temp (–±–°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP $(\Delta p^{1/2})$**	**Local Stack Velocity $(v_s)_i$**	**Cumul. Meter Volume $(V_m)_{std}$**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume $(V_m)_{std}$**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	316.870	0.97	1.909	1.80	226	251	254	67			80	78	2.0	0.98	63.35	1.906	98.6	45.736
A-2	2.5	00:02:30	318.800	1.10	2.165	2.10	229	253	257	65			61	78	2.0	1.05	67.60	3.929	98.6	47.153
A-3	5.0	00:05:00	320.850	1.30	2.559	2.50	226	250	254	63			81	78	2.0	1.14	73.33	6.222	100.0	49.776
A-4	7.5	00:07:30	323.170	1.20	2.362	2.30	224	250	255	65			82	77	2.0	1.10	70.35	6.326	99.4	49.954
A-5	10.0	00:10:00	325.300	1.40	2.756	2.70	221	254	254	67			83	78	2.0	1.18	75.82	10.674	99.7	51.237
A-6	12.5	00:12:30	327.680	1.10	2.165	2.10	217	254	255	68			83	78	1.0	1.05	67.01	12.615	98.8	50.462
B-1	15.0	00:15:00	329.650	0.84	1.653	1.60	214	255	254	68			81	78	1.0	0.92	58.43	14.390	98.7	49.338
B-2	17.5	00:17:30	331.450	0.92	1.811	1.80	219	255	257	67			83	78	1.0	0.96	61.38	16.173	98.2	48.518
B-3	20.0	00:20:00	333.260	1.10	2.165	2.10	213	254	255	62			84	78	2.0	1.05	66.62	16.476	99.8	49.270
B-4	22.5	00:22:30	335.600	1.10	2.165	2.10	211	254	253	59			83	78	2.0	1.05	66.72	20.427	99.2	49.025
B-5	25.0	00:25:00	337.580	1.30	2.559	2.50	211	254	257	58			63	78	2.0	1.14	72.53	22.420	98.2	48.915
B-6	27.5	00:27:30	339.600	0.86	1.693	1.60	207	254	251	57			63	79	1.0	0.93	58.61	24.189	98.0	48.379
C-1	30.0	00:30:00	341.400	0.62	1.220	1.20	219	249	251	61			80	78	1.0	0.79	50.39	26.063	99.7	48.116
C-2	32.5	00:32:30	343.300	0.73	1.437	1.40	216	249	258	58			81	79	1.0	0.85	54.55	27.510	98.9	47.160
C-3	35.0	00:35:00	344.770	0.74	1.457	1.40	213	248	255	57			83	78	1.0	0.86	54.60	29.222	99.0	46.755
C-4	37.5	00:37:30	346.510	0.70	1.378	1.30	213	249	258	56			84	78	1.0	0.84	53.30	30.912	99.2	46.368
C-5	40.0	00:40:00	348.230	0.70	1.378	1.30	213	258	259	57			84	78	1.0	0.84	53.30	32.651	99.5	48.095
C-6	42.5	00:42:30	350.000	0.50	0.984	0.96	209	251	260	58			82	78	1.0	0.71	44.91	33.998	99.3	45.331
D-1	45.0	00:45:00	351.370	0.73	1.437	1.40	230	249	257	62			81	78	1.0	0.85	55.11	35.723	99.5	45.124
D-2	47.5	00:47:30	353.120	0.84	1.653	1.60	227	255	258	55			83	78	1.0	0.92	58.99	37.505	99.5	45.005
D-3	50.0	00:50:00	354.930	0.85	1.673	1.60	227	249	257	53			81	78	1.0	0.92	59.34	39.279	99.4	44.891
D-4	52.5	00:52:30	358.730	0.81	1.594	1.50	227	252	258	53			81	78	1.0	0.90	57.93	41.044	99.5	44.775
D-5	55.0	00:55:00	358.520	0.69	1.358	1.30	227	249	258	53			80	78	1.0	0.83	53.47	42.711	99.6	44.568
D-6	57.5	00:57:30	360.210	0.41	0.807	0.78	222	251	259	53			80	77	1.0	0.64	41.06	44.032	99.7	44.032
Last Pt	60.0	01:00:00	381.550																	
Final Val	60.0	01:00:00	361.550											**Max Vac**	2.0	**Final Values**		44.032	99.7	
Average Values				0.90		1.71	219	252	256	60			82	78		0.94	59.97			
													80							

CTM 027 (AMMONIA) SOURCE SAMPLING TITLE PAGE ISOKINETIC SAMPLING DATA

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Date	03/13/11
Operator	TG
Run Number	Base w/DB-3

Ideal Nozzle Diameter and IsoKinetic Factor Setup			
Pitot Coefficient	(C_p)	0.840	
Average Stack Temp	(t_s)	223.3	°F
Average Meter Temp	(t_m)	80.5	
Orifice Meter Coefficient	($\Delta H@$)	1.745	in H_2O
Square Root ΔP	($\Delta p^{1/2}{}_{avg}$)	0.97	in H_2O
Stack Moisture Content	(B_{ws})	9.93	%
Stack Dry Molecular Weight	(M_d)	29.26	lb/lb-mole
Estimated Orifice Flow Rate	(Q_m)	0.73	acfm
ΔP to ΔH Isokinetic Factor	(K)	1.95	

Leak Checks					
Train	**Pre**	0.000	ft³/min@	15.0	in Hg
PASS	**Post**	0.000	ft³/min@	15.0	in Hg
Pitot	**Pre (+)**	5.0	in H_2O for	15.0	sec
PASS	**Pre (-)**	4.0	in H_2O for	15.0	sec
	Post (+)	4.0	in H_2O for	15.0	sec
	Post (-)	5.0	in H_2O for	15.0	sec

Sampling Equipment			
Meter Box Number	SAMP-CP-0010		
Meter Cal Factor	(Y)	0.991	
Nozzle Number	I8		
Average Nozzle Diameter	(D_{na})	0.2300	in
Suggested Nozzle Diameter	(D_{ni})	0.2118	in
Probe Number	SAMP-HP-0001		in
Probe Length	120		in
Liner Material	inconel		
Sample Case / Oven Number	SAMP-BH-0025		
Impinger Case Number	SAMP-BC-0021		

Nozzle Measurements				
Pre	0.230	0.230	0.230	**PASS**
Post	0.230	0.230	0.230	**PASS**

Pressures			
Barometric Pressure	(P_b)	30.30	in Hg
Stack Static Pressure	(P_{static})	0.75	in H_2O
Absolute Stack Pressure	(P_s)	30.36	in Hg
Absolute Meter Pressure	(P_m)	30.43	in Hg

Run Time			
Start	12:52	**End**	14:05

Weights	**Imp 1**	**Imp 2**	**Imp 3**	**Imp 4**	**Imp 5**	**Imp 6**	**Imp 7**	**Imp 8**
Pre	740.6	737.6	614.8	869.2				
Post	812.1	756.5	618.5	881.8				

Wash Volumes					ml
					ml

Traverse Point #	**Sampling Time (Θ)**	**Timer Time**	**Dry Gas Meter Reading (V_m)**	**Velocity Head (Δp)**	**Desired Orifice ΔH (ΔH_d)**	**Actual Orifice ΔH (ΔH_a)**	**Stack Temp (t_s)**	**Probe Temp (248±25°F)**	**Filter Temp (248±25°F)**	**Impinger Exit Temp (≤68°F)**	**Cond. Temp (≤--°F)**	**CPM Filter Temp (--±--°F)**	**Meter Inlet Temp (t_{mi})**	**Meter Outlet Temp (t_{mo})**	**Pump Vacuum**	**Square Root ΔP ($\Delta p^{1/2}$)**	**Local Stack Velocity (v_s)ᵢ**	**Cumul. Meter Volume (V_m)std**	**Cumul. Percent IsoKinetic (I)**	**Est-Run Meter Volume (V_m)std**
	min	hh:mm:ss	ft³	in H_2O	in H_2O	in H_2O	°F	°F	°F	°F	°F	°F	°F	°F	in Hg	√(in H_2O)	ft/sec	dscf	%	dscf
A-1	0.0	00:00:00	361.820	0.75	1.462	1.50	229	254	255	68			81	78	1.0	0.87	55.85	1.834	108.4	44.005
A-2	2.5	00:02:30	363.680	0.83	1.618	1.60	232	252	257	61			84	78	1.0	0.91	58.88	3.485	101.1	41.825
A-3	5.0	00:05:00	365.360	0.82	1.598	1.60	229	252	258	55			87	78	1.0	0.91	58.40	5.290	101.4	42.317
A-4	7.5	00:07:30	367.200	0.82	1.598	1.60	230	251	258	54			85	78	1.0	0.91	58.44	7.058	101.1	42.347
A-5	10.0	00:10:00	369.000	0.77	1.501	1.50	229	249	254	55			84	79	1.0	0.88	56.59	8.826	101.5	42.364
A-6	12.5	00:12:30	370.800	0.70	1.364	1.40	230	251	260	58			83	80	1.0	0.84	54.00	10.524	101.9	42.098
B-1	15.0	00:15:00	372.530	0.63	1.228	1.20	223	254	258	61			60	79	1.0	0.79	50.97	12.120	102.0	41.555
B-2	17.5	00:17:30	374.150	0.77	1.501	1.50	220	249	257	55			83	79	1.0	0.86	56.22	13.890	102.0	41.869
B-3	20.0	00:20:00	375.950	0.75	1.482	1.50	219	249	257	54			84	79	1.0	0.87	55.45	15.628	102.0	41.675
B-4	22.5	00:22:30	377.720	0.71	1.384	1.40	219	251	257	53			83	79	1.0	0.84	53.95	17.328	102.1	41.588
B-5	25.0	00:25:00	379.450	0.71	1.384	1.40	215	247	246	55			81	79	1.0	0.84	53.79	18.854	101.3	41.137
B-6	27.5	00:27:30	381.000	0.51	0.994	1.00	212	241	255	56			80	79	1.0	0.71	45.49	20.538	102.7	41.078
C-1	30.0	00:30:00	382.710	0.85	1.657	1.70	219	257	252	61			80	78	1.0	0.92	59.03	22.305	102.3	41.179
C-2	32.5	00:32:30	384.500	1.10	2.144	2.20	220	257	261	63			80	78	1.0	1.05	67.20	25.023	105.5	42.897
C-3	35.0	00:35:00	387.250	1.10	2.144	2.20	218	258	254	62			80	77	1.0	1.05	67.10	26.754	104.1	42.807
C-4	37.5	00:37:30	389.000	1.20	2.339	2.40	218	256	257	63			81	77	2.0	1.10	70.06	29.076	104.4	43.617
C-5	40.0	00:40:00	391.350	1.20	2.339	2.40	216	252	254	66			82	77	2.0	1.10	89.98	31.034	103.5	43.813
C-6	42.5	00:42:30	393.330	1.10	2.144	2.20	214	251	257	67			83	78	1.0	1.05	66.90	33.183	103.5	44.244
D-1	45.0	00:45:00	395.510	1.20	2.339	2.40	227	252	255	60			82	78	2.0	1.10	70.55	35.246	103.1	44.521
D-2	47.5	00:47:30	397.600	1.20	2.339	2.40	229	255	253	59			85	78	2.0	1.10	70.85	37.529	103.3	45.035
D-3	50.0	00:50:00	399.920	1.30	2.534	2.60	229	255	250	54			84	80	2.0	1.14	73.53	39.969	103.7	45.679
D-4	52.5	00:52:30	402.400	1.30	2.534	2.60	229	258	248	56			83	80	2.0	1.14	73.53	41.348	102.3	45.106
D-5	55.0	00:55:00	403.800	1.40	2.729	2.80	226	252	251	56			82	80	2.0	1.18	76.14	43.598	102.0	45.491
D-6	57.5	00:57:30	406.060	1.40	2.729	2.80	226	250	254	57			82	79	1.0	1.18	76.14	45.629	101.4	45.629
Last Pt	60.0	01:00:00	408.140																	
Final Val	60.0		406.140											**Max Vac**	2.0	**Final Values**		45.629	101.4	
Average Values				0.96		1.91	223	252	255	59			82	79		0.97	62.45			
													81							

SAMPLE RECOVERY AND INTEGRITY DATA SHEET

Plant Name	West County Energy Center	**Date**	03/13/11
Sampling Location	Unit 3C	**Operator**	TG
Project #	bv-10-westcounty.fl-comp#2		

Run History Data

Run Number	Base w/DB-1	Base w/DB-2	Base w/DB-3	
Run Start Time	09:55	11:23	12:52	(hh:mm)
Run Stop Time	11:08	12:35	14:05	(hh:mm)
Train Prepared By	AS	AS	AS	
Train Recovered By	AS	AS	AS	
Recovery Date	03/13/11	03/13/11	03/13/11	(mm/dd/yy)
Relinquished By	TG	TG	TG	
Received By	AS	AS	AS	
Relinquished Date	03/13/11	03/13/11	03/13/11	(mm/dd/yy)
Relinquished Time	11:08	12:35	14:05	(hh:mm)

Equipment Identification Numbers

Impinger Case	SAMP-BH-0025	SAMP-BH-0025	SAMP-BH-0025
Sample Box	SAMP-BC-0021	SAMP-BC-0020	SAMP-BC-0021

Sample Blank Taken ☑ YES

Moisture Content Data

Impingers 1, 2, and 3 - Liquid Weight

Final Weight	(W_f)	2206.7	2159.0	2187.1	g
Initial Weight	(W_i)	2118.4	2071.3	2093.0	g
Net Weight	(W_n)	88.3	87.7	94.1	g
Comments					

Impinger 4 - Silica Gel Weight

Final Weight	(W_f)	858.7	813.6	881.8	g
Initial Weight	(W_i)	850.5	801.4	869.2	g
Net Weight	(W_n)	8.2	12.2	12.6	g
Comments					

Total Water Collected

Total Weight	(W_{lc})	96.5	99.9	106.7	g
Total Volume	(V_{lc})	96.7	100.1	106.9	ml

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Historical Data	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Run Start Time	09:55	11:23	12:52		hh:mm
Run Stop Time	11:08	12:35	14:05		hh:mm
Test Date	03/13/11	03/13/11	03/13/11		mm/dd/yy
Meter Calibration Factor	0.991	0.991	0.991		
Pitot Tube Coefficient	0.840	0.840	0.840		
Average Nozzle Diameter	0.230	0.230	0.230		in
Stack Test Data	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Initial Meter Volume	272.530	316.870	361.820		ft^3
Final Meter Volume	316.580	361.550	408.140		ft^3
Total Meter Volume	44.050	44.680	46.320	45.017	ft^3
Total Sampling Time	60.00	60.00	60.00	60.00	min
Average Meter Temperature	81.71	79.98	80.50	80.73	°F
Average Stack Temperature	242.08	219.21	223.25	228.18	°F
Barometric Pressure	30.23	30.30	30.30	30.28	in Hg
Stack Static Pressure	0.75	0.75	0.75	0.75	in H_2O
Absolute Stack Pressure	30.29	30.36	30.36	30.33	in Hg
Average Orifice Pressure Drop	1.72	1.71	1.91	1.78	in H_2O
Absolute Meter Pressure	30.36	30.43	30.43	30.40	in Hg
Avg Square Root Pitot Pressure	0.97	0.94	0.97	0.96	$\sqrt{(\text{in } H_2O)}$
Moisture Content Data	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Impinger Water Weight Gain	88.30	87.70	94.10	90.03	g
Silica Gel Weight Gain	8.20	12.20	12.60	11.00	g
Total Water Volume Collected	96.67	100.08	106.89	101.22	ml
Standard Water Vapor Volume	4.55	4.71	5.03	4.76	scf
Standard Meter Volume	43.2	44.0	45.6	44.3	dscf
Calculated Stack Moisture	9.53	9.66	9.93	9.71	%
Saturated Stack Moisture	100.00	100.00	100.00	100.00	%
Reported Stack Moisture Content	9.53	9.66	9.93	9.71	%

CTM 027 (AMMONIA) - RESULTS

Plant Name	West County Energy Center
Sampling Location	Unit 3C
Project #	bv-10-westcounty.fl-comp#2

Gas Analysis Data	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Carbon Dioxide Content	4.8	4.8	4.8	4.8	%
Oxygen Content	12.4	12.4	12.5	12.4	%
Carbon Monoxide Content	1.1	1.0	1.0	1.0	ppm
Nitrogen Content	82.8	82.8	82.8	82.8	%
Stack Dry Molecular Weight	29.26	29.26	29.26	29.26	lb/lb-mole
Stack Wet Molecular Weight	28.18	28.17	28.14	28.17	lb/lb-mole
Calculated Fuel Factor	1.787	1.778	1.775	1.780	
Fuel F-Factor	8639.90	8639.90	8639.90	8639.90	dscf/MMBtu
Percent Excess Air	131.2	131.5	132.4	131.7	%
Volumetric Flow Rate Data	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Average Stack Gas Velocity	62.78	59.97	62.45	61.73	ft/sec
Stack Cross-Sectional Area	378.35	378.35	378.35	378.35	ft^2
Actual Stack Flow Rate	1,425,135	1,361,407	1,417,739	1,401,427	acfm
Wet Standard Stack Flow Rate	65,091	64,423	66,692	65,402	wkscfh
Dry Standard Stack Flow Rate	58,884,700	58,196,746	60,067,905	59,049,783	dscfh
Percent of Isokinetic Rate	96.6	99.7	101.4	99.3	%
Ammonia Analysis (CTM-027)	**Base w/DB-1**	**Base w/DB-2**	**Base w/DB-3**	**Average**	**Units**
Sample Number (Front Half)	02	04	06		
Sample Number (Back Half)	03	05	07		
Lab Log Number (Front Half)	U3C-R1DB-FH	U3C-R2DB-FH	U3C-R3DB-FH		
Lab Log Number (Back Half)	U3C-R1DB -BH	U3C-R2DB-BH	U3C-R3DB-BH		
Front Half Results (C_f)	8.9000	7.5400	8.0500	8.1633	mg/l
Back Half Results (C_b)	0.2190	0.1340	0.1900	0.1810	mg/l
Practical Quantitation Limit	0.0000	0.0000	0.0000	0.0000	mg/l
Blank Results	0.0000	0.0000	0.0000	0.0000	mg/l
Front Half Sample Volume	220	210	210	213	ml
Back Half Sample Volume	200	200	200	200	ml
Volume of NH_3	0.00263	0.00212	0.00227	0.00234	L
NH_3 Concentration	2.15	1.70	1.76	1.87	ppmvd
NH_3 Concentration	1.50	1.18	1.23	1.30	ppm@15%O_2

TEST RESULTS

Opacity
Base Load

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3C Base
Location: West County Energy Center
Date: March 12, 2011
Project #: bv-10-westcounty.fl-comp#2

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 U3C Base
Location: West County Energy Center
Date: March 12, 2011
Project #: bv-10-westcounty.fl-comp#2

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 U3C Base
Location: West County Energy Center
Date: March 12, 2011
Project #: bv-10-westcounty.fl-comp#2

Run 3

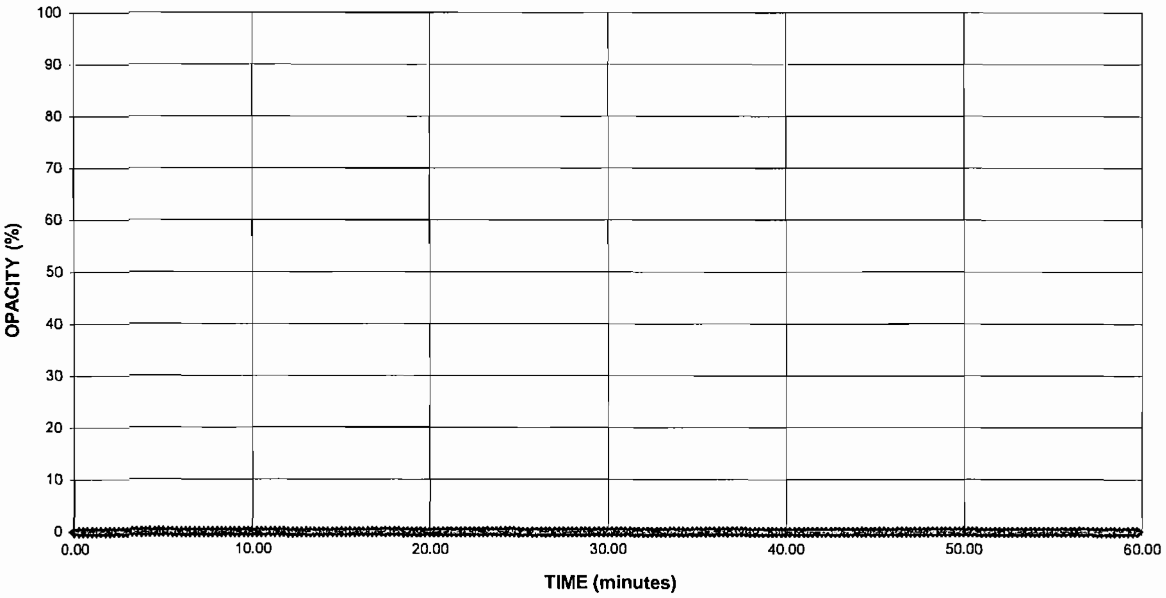
Average Opacity: 0.00 %
Maximum Opacity: 0 %
6 Minute Average: 0.00 %
6 Minute Maximum: 0.00 %
Max Time w/ Opacity: 0.00 minutes

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

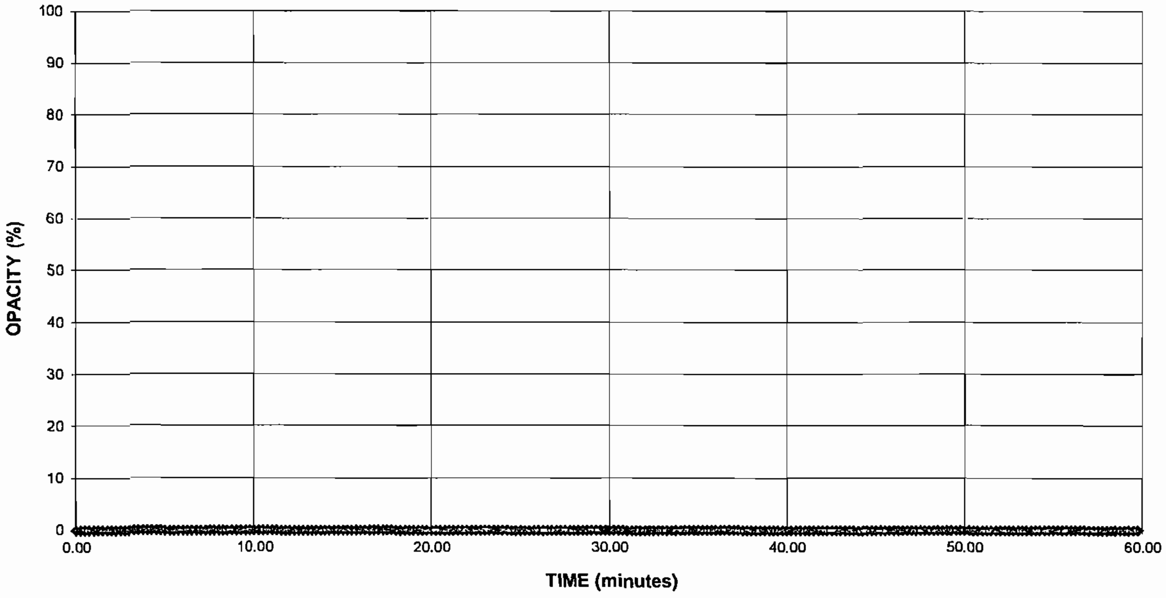
Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit U3C Base
Location: West County Energy Center
Date: March 12, 2011
Project #: bv-10-westcounty.fl-comp#2

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)

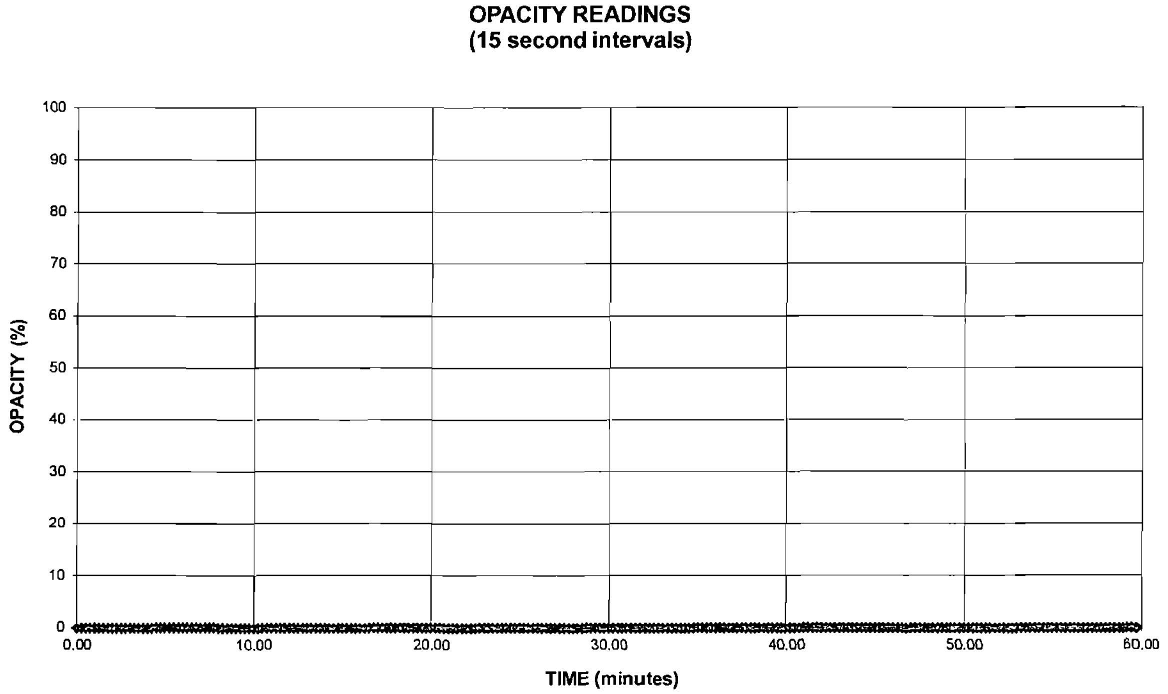


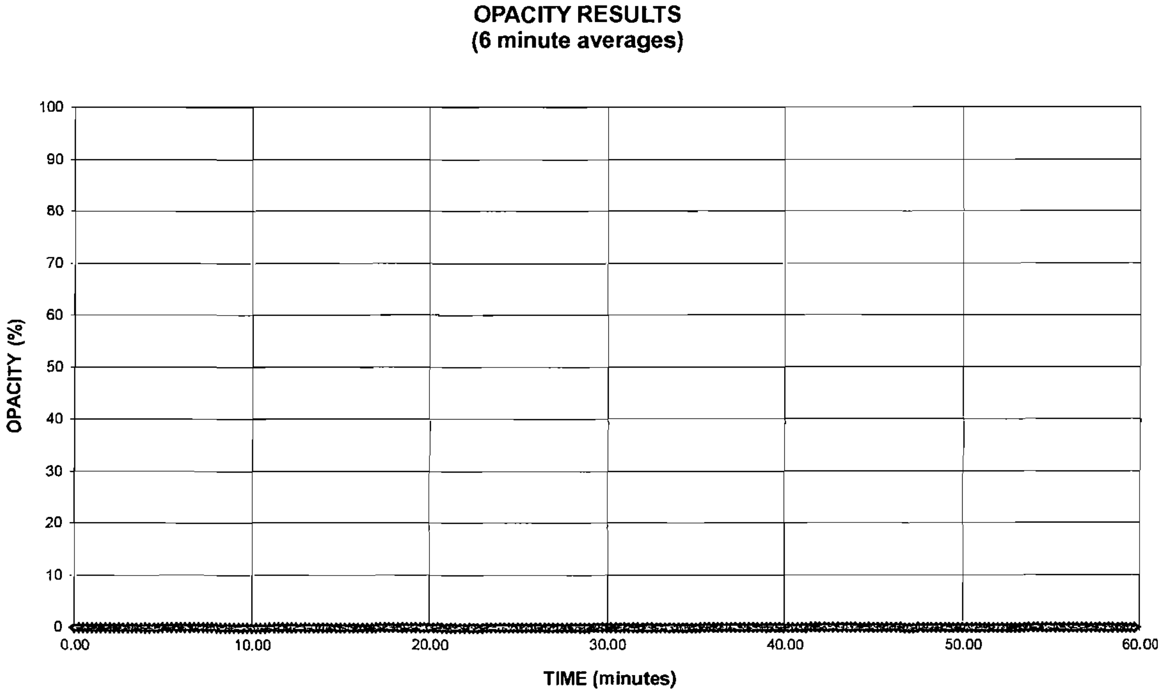
OPACITY RESULTS
(6 minute averages)



Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit U3C Base
Location:	West County Energy Center
Date:	March 12, 2011
Project #:	bv-10-westcounty.fl-comp#2

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

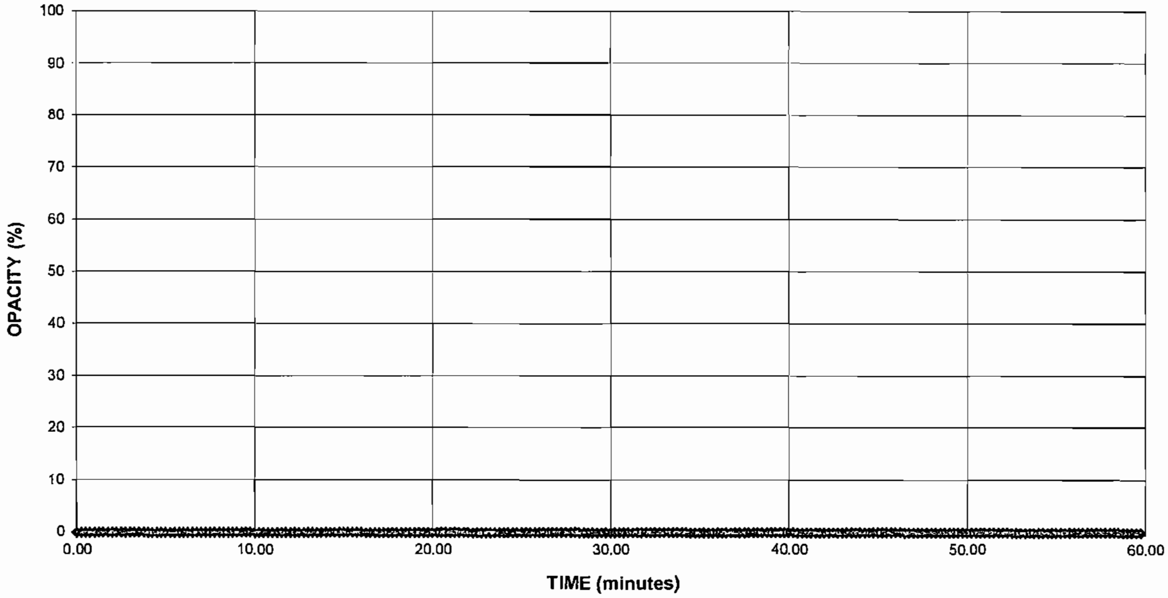




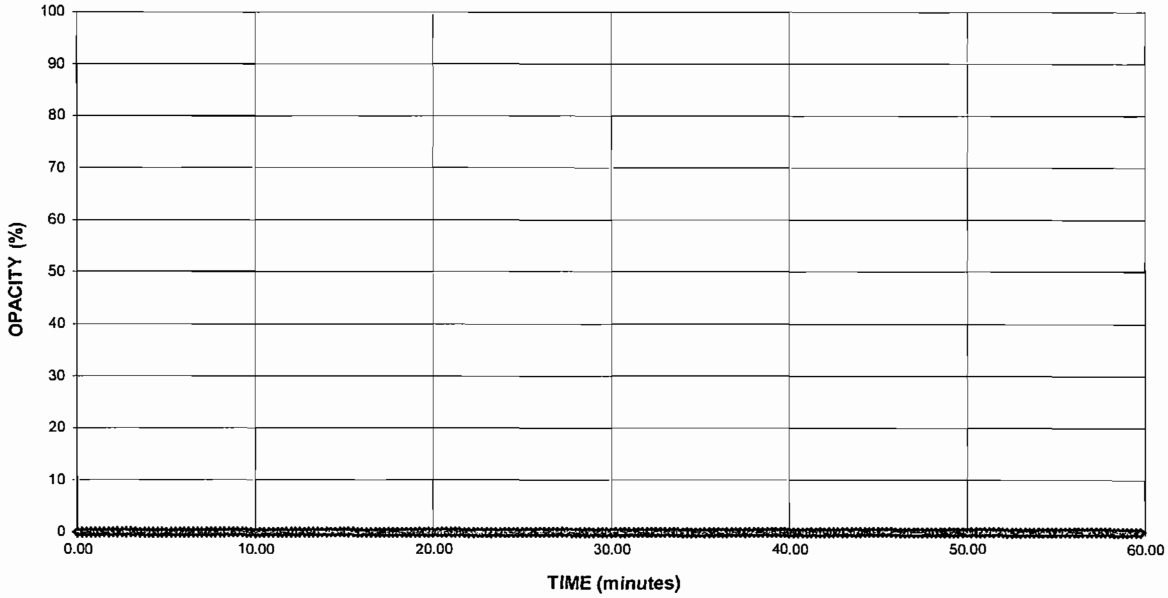
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit U3C Base
Location:	West County Energy Center
Date:	March 12, 2011
Project #:	bv-10-westcounty.fl-comp#2

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: ____________

Company Name: FPL
Facility Name: West County Energy Center
Street Address: 20505 St Rd 80
City: Loxahatchee State: FL Zip: 33470

Process: NG Unit #: 3C Operating Mode: Base w/o DB
Control Equipment: HRSG Operating Mode: Base

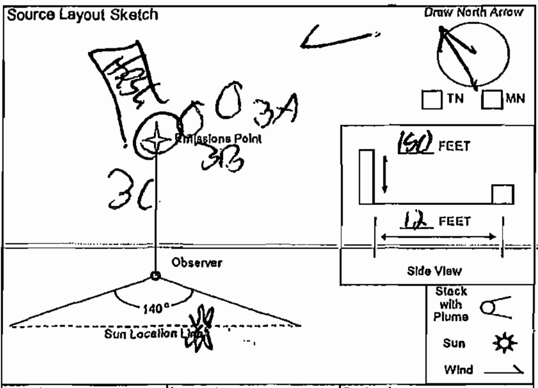
Describe Emissions Point: combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500ft @ 180° End 500ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start 5-10 End 5-10
Wind Direction Start East End East
Ambient Temp. Start 67 End 75
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number: bv-10-westcounty-f1-3c-1 Page 1 of 6
Continued on Form Number: bv-10-westcounty-f1
Observation Date: 12Mar11 Time Zone: Eastern Start Time: 1105 End Time: 1204

Min. \ Sec.	0	15	30	45	Comments
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): Rob White
Observer's Signature: Date: 12Mar11
Organization: AHI
Certified By: ETA Date: 02-Sep-10

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

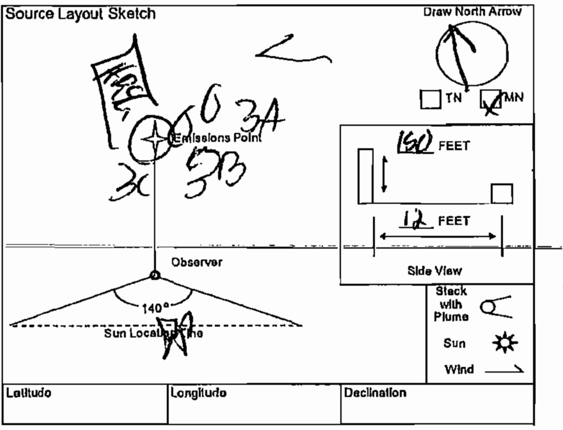
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start 2° End 2°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180 End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue Sky Conditions Start Clear End clear
Wind Speed Start 5-10 End 5-10 Wind Direction Start East End East
Ambient Temp. Start 67 End 75 Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3c-2 Page 2 of 6
Continued on Form Number bv-10-westcounty-f1-3c-1
Observation Date 12 Mar 11 Time Zone Eastern Start Time 1205 End Time 1204

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 12 Mar 11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/oDB
Control Equipment HRSG Operating Mode Base

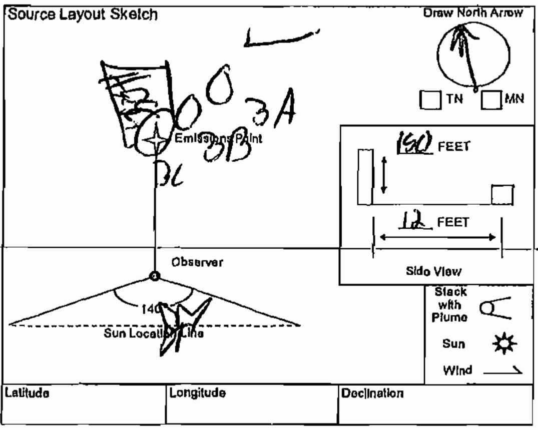
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500ft End 500ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Velical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500ft @ 180° End 500ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start 5-10 End 5-10
Wind Direction Start East End East
Ambient Temp. Start 75 End 75
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bV-10-westcounty-F1-3C-3 Page 3 of 6
Continued on Form Number bV-10-westcounty-F1-3C-2
Observation Date 12Mar11 Time Zone Eastern Start Time 1207 End Time 1306

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 12Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

VISUAL EMISSIONS OBSERVATION FORM

Form Number: bv-10-westcounty-fl-3C-4
Page 4 of 6
Continued on Form Number: bv-10-westcounty-fl-3C-3

Company Name: FPL
Facility Name: West County Energy Center
Street Address: 20505 St Rd 80
City: Loxahatchee State: FL Zip: 33470

Process: NG Unit #: 3C Operating Mode: Base w/o DB
Control Equipment: HRSG Operating Mode: Base

Describe Emissions Point: combine cycle natural Gas Turbine with no visible Emissions

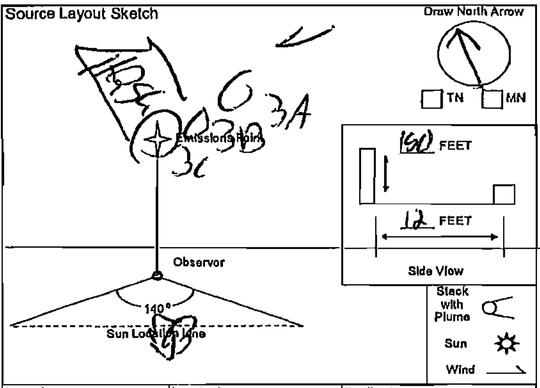
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start 5-10 End 5-10
Wind Direction Start East End East
Ambient Temp. Start 77 End 79
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

Observation Date: 10Mar11
Time Zone: Eastern
Start Time: 1007
End Time: 1306

Min. \ Sec.	0	15	30	45	Comments
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): Rob White
Observer's Signature: Rob White Date: 10Mar11
Organization: AHI
Certified By: ETA Date: 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/o DB
Control Equipment HRSG Operating Mode Base

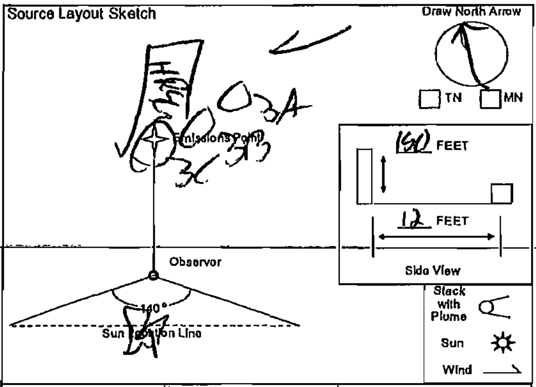
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start 6-10 End 6-10
Wind Direction Start East End East
Ambient Temp. Start 75 End 75
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3c-5 Page 5 of 6
Continued on Form Number bv-10-westcounty-fl-3c-4
Observation Date 12Mar11 Time Zone Eastern Start Time 1310 End Time 1409

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 12Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/o DD
Control Equipment HRSG Operating Mode Base

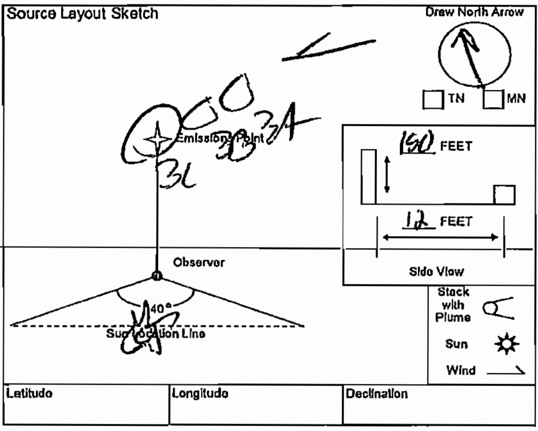
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start 5-10 End 5-10
Wind Direction Start East End East
Ambient Temp. Start 75 End 75
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3c-6 Page 6 of 6
Continued on Form Number bv-10-westcounty-fl-3c-5
Observation Date 10Mar11
Time Zone Eastern
Start Time 1310
End Time 1409

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 10Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

TEST RESULTS

Opacity
Base Load with Duct Burners

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3C Base wDB
Location: West County Energy Center
Date: March 13, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3C Base wDB
Location: West County Energy Center
Date: March 13, 2011
Project #: bv-10-westcounty.fl-comp#2

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

Company: Florida Power and Light
Equipment: Mitsubishi 501G, Unit 3C Base wDB
Location: West County Energy Center
Date: March 13, 2011
Project #: bv-10-westcounty.fl-comp#2

Run 3

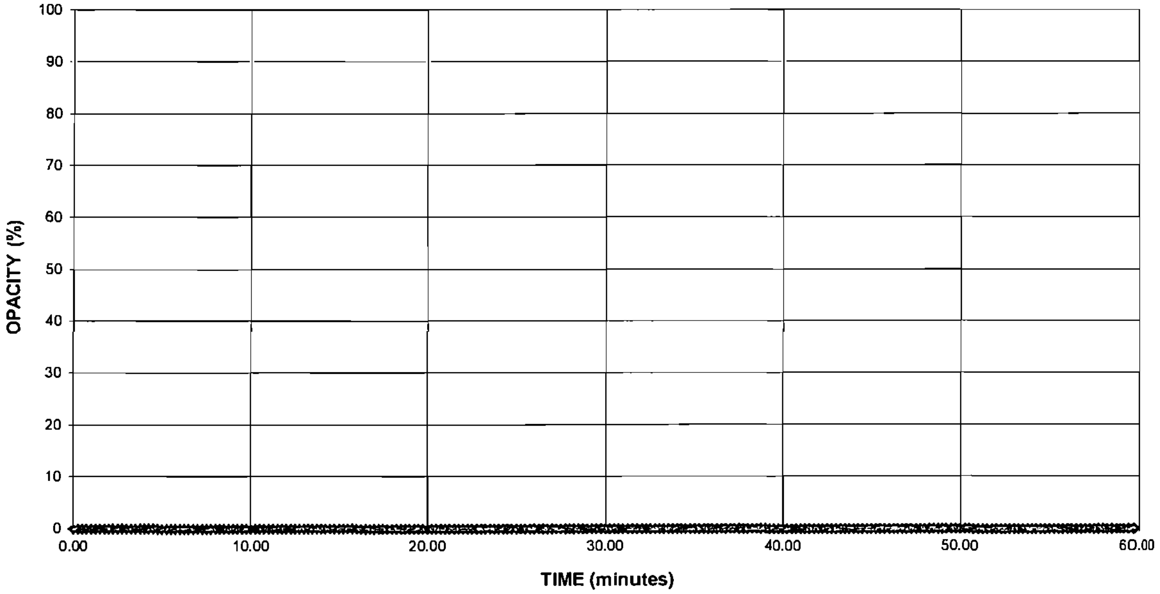
Average Opacity:	0.00	%
Maximum Opacity:	0	%
6 Minute Average:	0.00	%
6 Minute Maximum:	0.00	%
Max Time w/ Opacity:	0.00	minutes

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

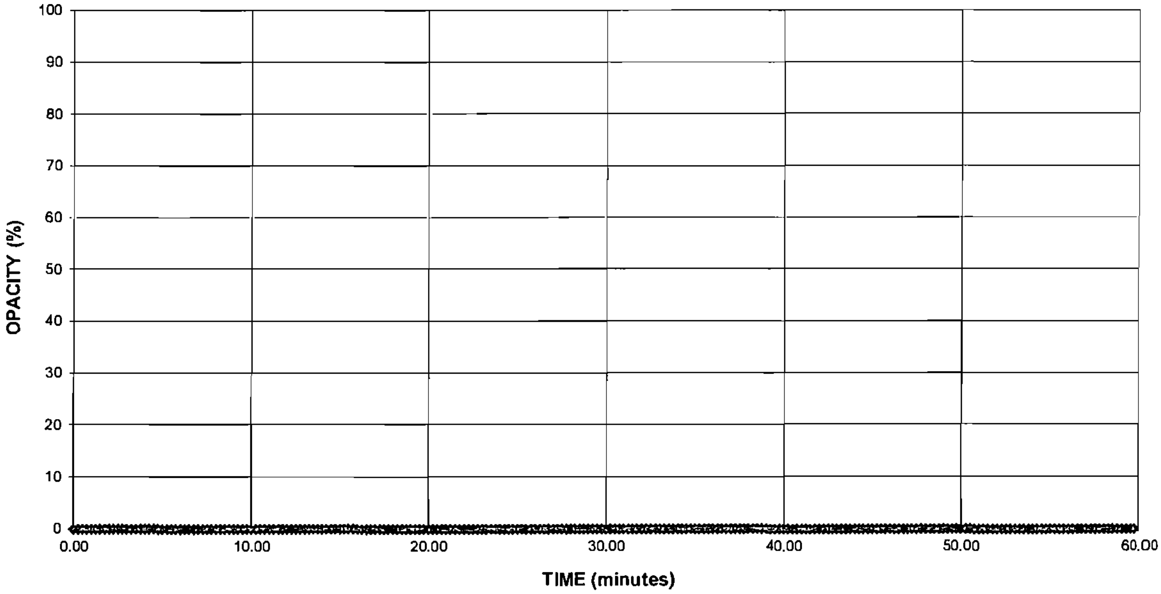
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit 3C Base wDB
Location:	West County Energy Center
Date:	March 13, 2011
Project #:	bv-10-westcounty.fl-comp#2

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)



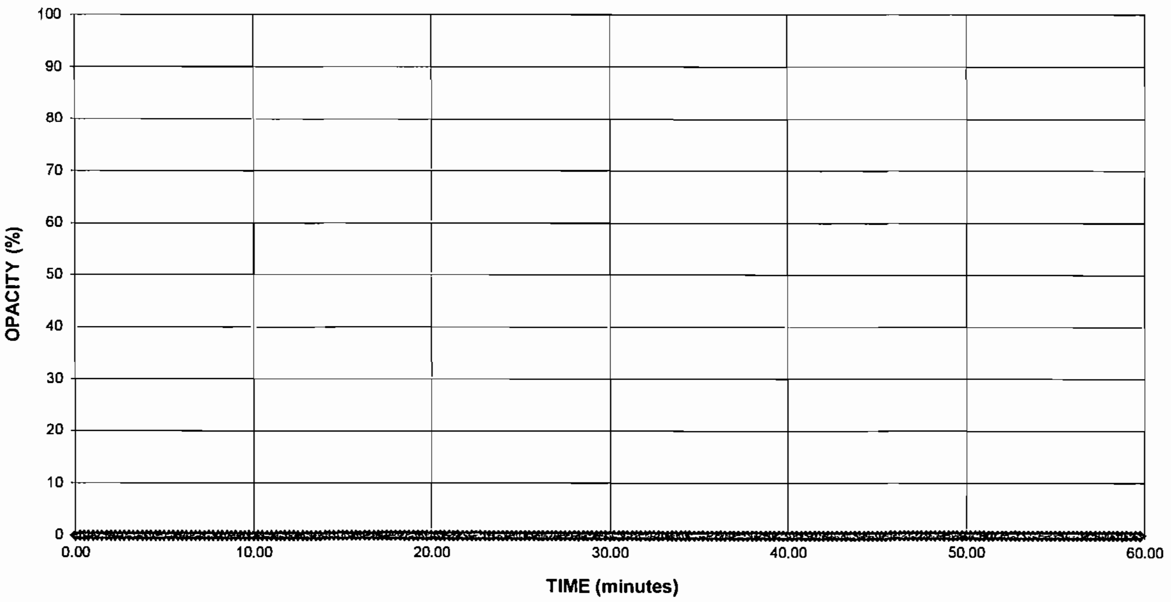
OPACITY RESULTS
(6 minute averages)



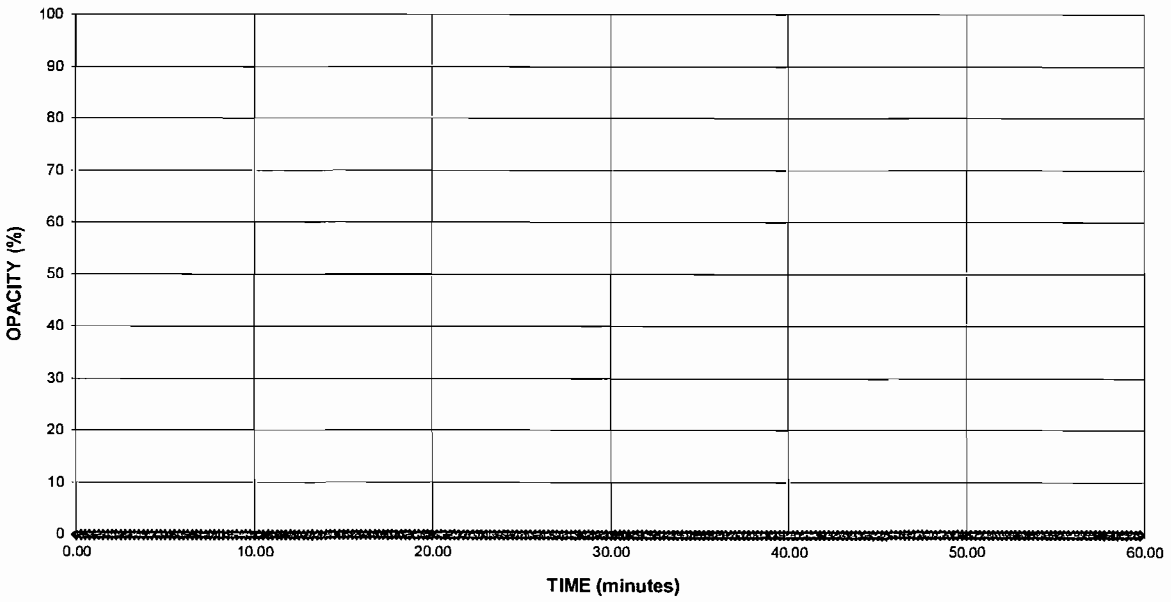
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit 3C Base wDB
Location:	West County Energy Center
Date:	March 13, 2011
Project #:	bv-10-westcounty.fl-comp#2

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)



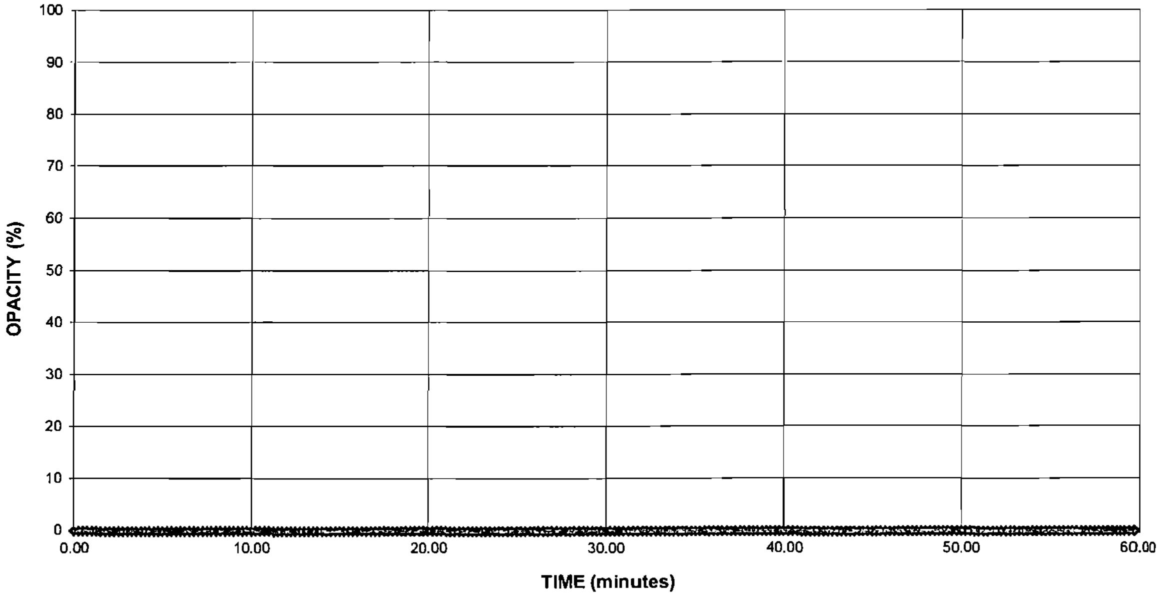
OPACITY RESULTS
(6 minute averages)



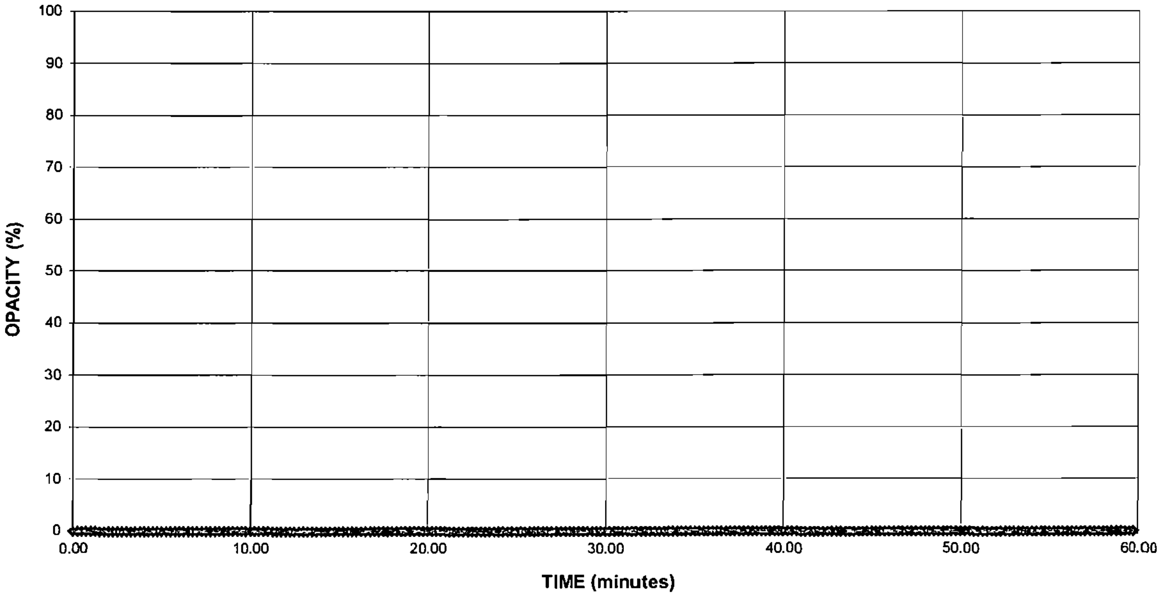
Company:	Florida Power and Light
Equipment:	Mitsubishi 501G, Unit 3C Base wDB
Location:	West County Energy Center
Date:	March 13, 2011
Project #:	bv-10-westcounty.fl-comp#2

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: ____________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/DB
Control Equipment HRSG Operating Mode Base

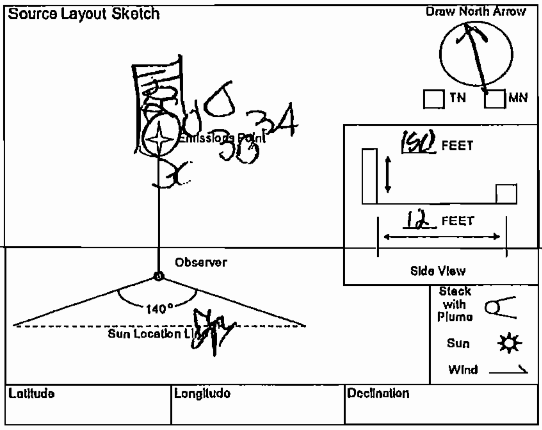
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 2° End 2°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 182°
Distance and Direction to Observation Point from Emission Point Start 500ft @ 180° End 500ft @ 182°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start calm End calm
Wind Direction Start NA End NA
Ambient Temp. Start 72 End 84
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number 5V-10-westcounty-f1-3CDB Page 1 of 6
Continued on Form Number bv-10-westcounty-f1
Observation Date 13Mar11 Time Zone Eastern Start Time 1106 End Time 1205

Sec. / Min.	0	15	30	45	Comments
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) Rob White
Observer's Signature Rob White Date 13Mar11
Organization AHI
Certified By ETA Date 22-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ________

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/ DB
Control Equipment HRSG Operating Mode Base

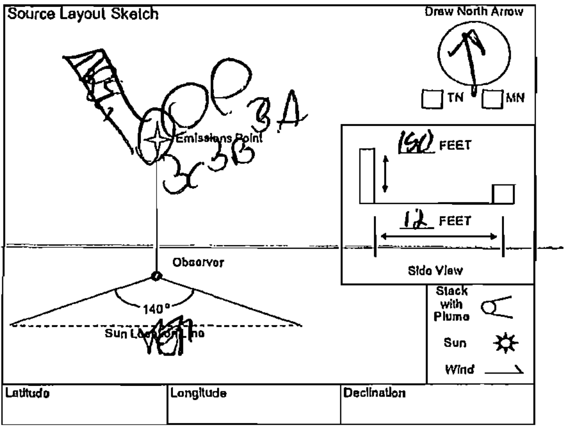
Describe Emissions Point combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vertical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start Clear End Clear
Wind Speed Start calm End calm
Wind Direction Start NA End NA
Ambient Temp. Start 72 End 84
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3CDB-0 Page 0 of 6
Continued on Form Number bv-10-westcounty-f1-3CDB-1
Observation Date 13Mar11 Time Zone Eastern Start Time 1106 End Time 1003

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 13Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

Company Name FPL
Facility Name West County Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Raised/DB
Control Equipment HRSG Operating Mode Base

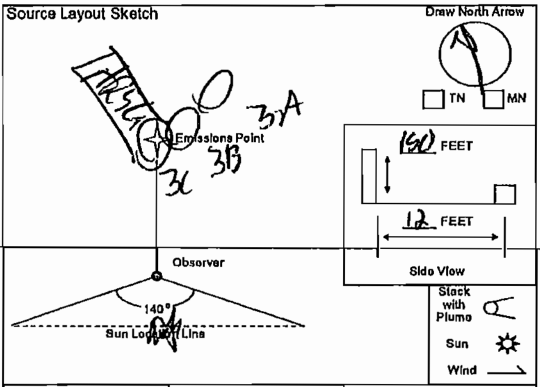
Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start calm End calm
Wind Direction Start NA End NA
Ambient Temp. Start 87 End 83
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-f1-3CDB3 Page 3 of 6
Continued on Form Number bv-10-westcounty-f1-3CDB-2
Observation Date 3Mar11
Time Zone Eastern
Start Time 1207
End Time 1306

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 3Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ____________

Company Name FPL
Facility Name West county Energy Center
Street Address 20505 St Rd 80
City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/DB
Control Equipment HRSG Operating Mode Base

Describe Emissions Point
combine cycle natural Gas Turbine with no visible Emissions

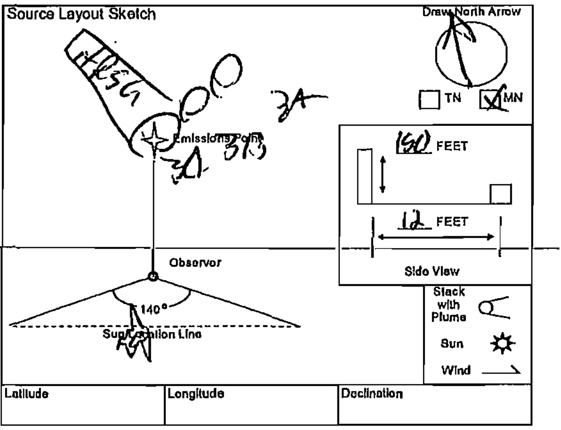
Height of Emiss. Pt. Start 150 ft End 150 ft
Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft
Distance to Emiss. Pt. Start 500 ft End 500 ft
Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End
Direction to Obs. Pt. (Degrees) Start 180° End 180°
Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV
Emission Color Start NV End NV
Water Droplet Plume Start NONE End NONE

Describe Plume Background Start Sky End Sky
Background Color Start Blue End Blue
Sky Conditions Start clear End clear
Wind Speed Start calm End calm
Wind Direction Start N/A End N/A
Ambient Temp. Start 84 End 83
Wet Bulb Temp.
RH Percent

Source Layout Sketch



Latitude
Longitude
Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-FL-3CDB-4 Page 4 of 6
Continued on Form Number bv-10-westcounty-FL-3CDB-3
Observation Date 3Mar11 Time Zone Eastern Start Time 1207 End Time 1306

Min. \ Sec.	0	15	30	45	Comments
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) Rob White
Observer's Signature Date 3Mar11
Organization AHI
Certified By ETA Date 02-Sep-10

Method Used (Circle One) [✓ Method 9] 203A 203B Other: ________

Company Name FPL

Facility Name West County Energy Center

Street Address 20505 St Rd 80

City Loxahatchee State FL Zip 33470

Process NG Unit # 3C Operating Mode Base w/DB

Control Equipment HRSG Operating Mode Base

Describe Emissions Pont combine cycle natural Gas Turbine with no visible Emissions

Height of Emiss. Pt. Start 150 ft End 150 ft Height of Emiss. Pt. Rel. to Observer Start 150 ft End 150 ft

Distance to Emiss. Pt. Start 500 ft End 500 ft Direction to Emiss. Pt. (Degrees) Start 0° End 0°

Vetical Angle to Obs. Pt. Start End Direction to Obs. Pt. (Degrees) Start 180° End 180°

Distance and Direction to Observation Point from Emission Point Start 500 ft @ 180° End 500 ft @ 180°

Describe Emissions Start NV End NV

Emission Color Start NV End NV Water Droplet Plume Start NONE End NONE

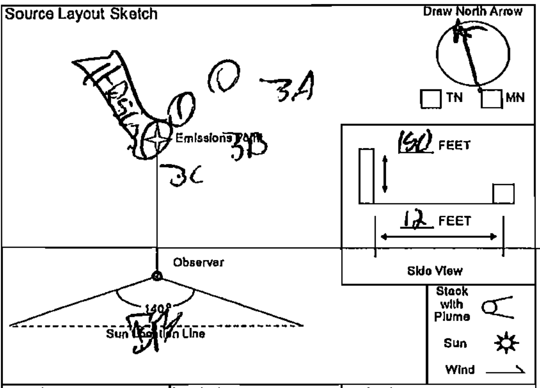
Describe Plume Background Start Sky End Sky

Background Color Start Blue End Blue Sky Conditions Start clear End clear

Wind Speed Start Calm End Calm Wind Direction Start N/A End N/A

Ambient Temp. Start 84 End 84 Wet Bulb Temp. RH Percent

Source Layout Sketch



Latitude Longitude Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number bv-10-westcounty-fl-3CDB-5 Page 5 of 6

Continued on Form Number bv-10-westcounty-fl-3CDB-6

Observation Date 13 Mar 11 Time Zone Eastern Start Time 1308 End Time 1407

Min. \ Sec.	0	15	30	45	Comments
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) Rob White

Observer's Signature Date 13 Mar 11

Organization AHI

Certified By ETA Date 02-Sep-10

Method Used (Circle One)
[✓ Method 9] 203A 203B Other: ______

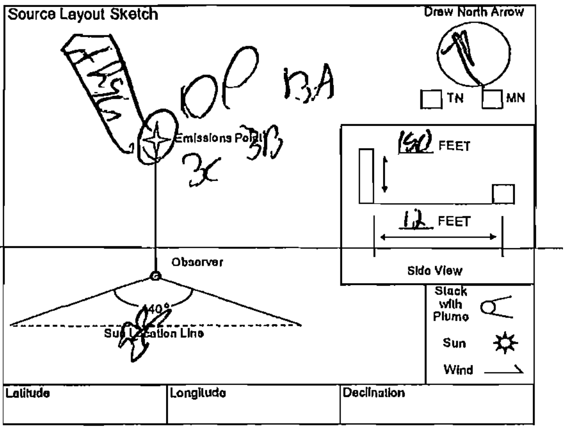
Company Name	FPL
Facility Name	West County Energy Center
Street Address	20505 St Rd 80
City	Loxahatchee
State	FL
Zip	33470

Process	NG
Unit #	3C
Operating Mode	Base w/DB
Control Equipment	HRSG
Operating Mode	Base

Describe Emissions Point
combine cycle natural Gas Turbine with no visible Emissions

Height of Emiss. Pt. Start	150 ft
Height of Emiss. Pt. End	150 ft
Height of Emiss. Pt. Rel. to Observer Start	150 ft
Height of Emiss. Pt. Rel. to Observer End	150 ft
Distance to Emiss. Pt. Start	500 ft
Distance to Emiss. Pt. End	500 ft
Direction to Emiss. Pt. (Degrees) Start	2°
Direction to Emiss. Pt. (Degrees) End	2°
Vertical Angle to Obs. Pt. Start	
Vertical Angle to Obs. Pt. End	
Direction to Obs. Pt. (Degrees) Start	180°
Direction to Obs. Pt. (Degrees) End	182°
Distance and Direction to Observation Point from Emission Point Start	500ft @ 182°
Distance and Direction to Observation Point from Emission Point End	500ft @ 182°
Describe Emissions Start	NV
Describe Emissions End	NV
Emission Color Start	NV
Emission Color End	NV
Water Droplet Plume Start	NONE
Water Droplet Plume End	NONE
Describe Plume Background Start	Sky
Describe Plume Background End	Sky
Background Color Start	Blue
Background Color End	Blue
Sky Conditions Start	Clear
Sky Conditions End	Clear
Wind Speed Start	Calm
Wind Speed End	Calm
Wind Direction Start	NA
Wind Direction End	NA
Ambient Temp. Start	84
Ambient Temp. End	84
Wet Bulb Temp.	
RH Percent	

Source Layout Sketch



Latitude	Longitude	Declination

Additional Information

VISUAL EMISSIONS OBSERVATION FORM

Form Number	bv-10-westcounty-f1-3cDB-6
Page	6 of 6
Continued on Form Number	bv-10-westcounty-f1-3cDB-5
Observation Date	13Mar11
Time Zone	Eastern
Start Time	1308
End Time	1408

Min. \ Sec.	0	15	30	45	Comments
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	
10	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)	Rob White
Observer's Signature	
Date	13Mar11
Organization	AHI
Certified By	ETA
Date	02-Sep-10

CALCULATIONS

EXAMPLE CALCULATIONS (FFACTOR)

RM 19, (12-17-09),
2.0 Summary of Method,
2.1 Emission Rates. Oxygen (O_2) or carbon dioxide (CO_2) concentrations and appropriate F factors (ratios of combustion gas volumes to heat inputs) are used to calculate pollutant emission rates from pollutant concentrations.

RM 19, (12-17-09),
12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in lb/MMBtu. The pollutant concentration must be in lb/scf and the F factor must be in scf/MMBtu. If the pollutant concentration (C) is not in the appropriate units, use Table 19–1 in Section 17.0 to make the proper conversion. An F factor is the ratio of the gas volume of the products of combustion to the heat content of the fuel. The dry F factor (F_d) includes all components of combustion less water, the wet F factor (F_w) includes all components of combustion, and the carbon F factor (F_c) includes only carbon dioxide.

Mark's Std Hdbk, 10th ed.,pg 4-26
High Heat Value Dry (HHV_{dry}), calc for Methane (single component for the fuel gas)

$$HHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times GCM\right] \qquad HHV_{dry}=\frac{97.11\ \%}{100.00}\times\frac{994.85\ \text{Btu}}{\text{SCF}}=\frac{966.13\quad \text{Btu}}{\text{SCF}}$$

Mark's Std Hdbk, 10th ed., pg 4-26
Low Heat Value Dry (LHV_{dry}), calc for Methane (single component for the fuel gas)

$$LHV_{dry}(Btu/SCF)=\left[\left(\frac{M_{\%}}{100}\right)\times NCM\right] \qquad LHV_{dry}=\frac{97.11\ \%}{100.00}\times\frac{895.75\ \text{Btu}}{\text{SCF}}=\frac{869.90\quad \text{Btu}}{\text{SCF}}$$

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

$$HHV_{wet}(Btu/SCF)=\frac{HHV_{dry}}{W/D.factor} \qquad HHV_{wet}=\frac{996.32\ \text{Btu/SCF}}{1.0236}=\quad 973.35\ \text{Btu/SCF}$$

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

$$LHV_{wet}(Btu/SCF)=\frac{LHV_{dry}}{W/D.factor} \qquad LHV_{wet}=\frac{897.55\ \text{Btu/SCF}}{1.0236}=\quad 876.86\ \text{Btu/SCF}$$

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

$$CM(lb/lb-mol)=\left[\left(\frac{M_{\%}}{100}\right)\times MW\right] \qquad CM=\frac{97.11\ \%}{100.00}\times\frac{16.04\quad \text{lb}}{\text{lb-mol}}=15.58\ \text{lb/lb-mol}$$

ASTM D 3588
Fuel Molecular Weight (MW_{Fuel})

$$MW_{Fuel}(lb/lb\cdot mol)=\left[\sum(CM)\right]$$

MW_{Fuel} = 15.58 lb/lb-mol
+ 0.41 lb/lb-mol
+ etc. = 16.609 lb/lb-mol

Btu per Lb of Gas Gross (**GCV**)

$$GCV(Btu/lb)=\left[\frac{HHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$GCV=\frac{996.32\ \text{Btu/SCF}\ \times\ 385.23\ \text{ft}^3\text{/lbmol}}{16.609\ \text{lb/lb-mol}}=23{,}108.78\ \text{Btu/lb}$$

ASTM D 3588 (SG)
Specific Gravity

$$SG=\left[\frac{MW_{Fuel}}{MW_{AIR}}\right] \qquad SG=\frac{16.61\ \text{lb/lb-mol}}{28.96\ \text{lb/lb-mol}}=\quad 0.5735$$

Btu per Lb of Gas Net (**NCV**)

$$NCV(Btu/lb)=\left[\frac{LHV_{dry}\times G}{MW_{Fuel}}\right]$$

$$NCV=\frac{897.55\ \text{Btu/SCF}\ \times\ 385.23\ \text{ft}^3\text{/lbmol}}{16.609\ \text{lb/lb-mol}}=20{,}817.95\ \text{Btu/lb}$$

Weight Percent of Component ($C_{\%}$), methane

$$C_{\%}(\%)=\left[\left(\frac{CM}{MW_{Fuel}}\right)\times 100\right]$$

$$C_{\%}=\frac{15.58\ \text{lb/lb-mol}}{16.61\ \text{lb/lb-mol}}\times\ 100\ =\ 93.80\ \%$$

Weight Percent of Volatile Organic Compounds ($VOC_{\%}$)

$$VOC_{\%}(\%)=\left[\sum_{C_3H_8}^{C_6H_{14}}M_{\%}\right] \qquad VOC_{\%}=\ 0.47\ \%\ +\ 0.07\ \%\ +\ 0.07\ \%\ +\ \text{etc.}=\ 0.66\ \%$$

RM 19, (12-17-09), 12.3.2 Determined **F Factors.** If the fuel burned is not listed in Table 19–2 or if the owner or operator chooses to determine an F factor rather than use the values in Table 19–2, use the procedure below: 12.3.2.1 Equations. Use the eq

RM 19, (07-19-6),
12.1 Nomenclature

K (scf/lb)/%

H	3.64
C	1.53
S	0.57
N_2	0.14
O_2	0.46

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

$$F_d=\frac{10^6\text{Btu}}{\text{MMBtu}}\times\left[\frac{3.64\ \text{SCF}}{\text{lb}\cdot\%}\times 24.20\ \%+\frac{1.53\ \text{SCF}}{\text{lb}\cdot\%}\times 73.43\ \%+\frac{0.57\ \text{SCF}}{\text{lb}\cdot\%}\times 0.00\ \%+\frac{0.14\ \text{SCF}}{\text{lb}\cdot\%}\times 0.61\ \%-\frac{0.46\ \text{SCF}}{\text{lb}\cdot\%}\times 1.76\ \%\right]\times\frac{\text{lb}}{23{,}108.78\ \text{Btu}}=\frac{8{,}641.62\ \text{SCF}}{\text{MMBtu}}$$

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

EXAMPLE CALCULATIONS (INFORMATION)

Specific Humidity (RH_{sp})

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

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

$$RH_{sp} = \frac{44.04\ \text{gr}}{\text{lb}} \times \frac{1\ \text{lb}}{7000\ \text{gr}} = 0.006292 \frac{\text{lb H}_2\text{O}}{\text{lb Air}}$$

Fuel Flow Conversion (Q_f)

Note: Qf(lb/min) is a value obtained from the source operator.

$$Q_f = \left[Q_f \times G \times \left(\frac{1}{MW_{Fuel}}\right)\right]$$

$$Q_f = \frac{1{,}859.89\ \text{lb}}{\text{min}} \times \frac{60\ \text{min}}{\text{hr}} \times \frac{385.23\ \text{ft}^3}{\text{lb-mol}} \times \frac{\text{lb-mol}}{16.61\ \text{lb}} = 2{,}588{,}030\ \text{SCFH}$$

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.

$$CIP / CDP = \left[(psig + P) \times \frac{51.71493\ mmHg}{1\ psi}\right]$$

$$\text{CIP / CDP} = \left[273.9\ \text{psig} + 14.8721\right] \times \frac{51.71493\ \text{mmHg}}{1\ \text{psia}} = 14{,}935\ \text{mmHg (abs)}$$

Heat Rate (MMBtu/hr)

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

$$\text{Heat Rate} = \frac{897.55\ \text{Btu}}{\text{SCF}} \times \frac{2{,}588{,}030.23\ \text{SCF}}{\text{hr}} \times \frac{\text{MMBtu}}{10^6\ \text{Btu}} = \frac{2{,}322.90\ \ \text{MMBtu}}{\text{hr}}$$

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)

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

$$\text{ACE} = \frac{5.03\ \text{ppm} - 4.93\ \text{ppm}}{12.10\ \text{ppm}} \times 100 = 0.83\ \%$$

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)

$$E_p = \frac{C_{Dir(H)} - C_{Dir(Z)}}{C_{V(H)} - C_{V(Z)}} \times C_{Dir(M)} + C_{Dir(Z)}$$

Eq. of a line
y=mx+b

$$E_p = \frac{8.52\ \text{ppm} - -0.01\ \text{ppm}}{8.46\ \text{ppm} - 0.00\ \text{ppm}} \times 4.76\ \text{ppm} + -0.01 = 4.79\ \text{ppm}$$

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

$$ACE_{THC} = \frac{4.87\ \text{ppm} - 4.79\ \text{ppm}}{4.76\ \text{ppm}} \times 100 = 1.69\ \%$$

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)

$$SB = \left(\frac{C_S - C_{Dir}}{CS}\right) \times 100$$

Eq. 7E-2

$$SB = \frac{5.10\text{ ppm} - 5.03\text{ ppm}}{12.10\text{ ppm}} \times 100 = 0.58\ \%$$

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)

$$D = \left|SB_{final} - SB_i\right|$$

Eq. 7E-4

$$D = |\ 0.58\ \% - 0.58\ \%\ | = 0.00\ \%$$

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)

$$SB / D_{Alt} = \left|C_S - C_{Dir}\right|$$

Eq. Section 13.2 and 13.3

$$SB / D_{Alt} = |\ 5.10\text{ ppm} - 5.03\text{ ppm}\ | = 0.07\text{ ppm}$$

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)

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

Eq. 7E-5b

$$C_{Gas} = \left(2.29\text{ ppm} - 0.00\text{ ppm}\right) \times \left(\frac{4.93\text{ ppm}}{5.10\text{ ppm} - 0.00\text{ ppm}}\right) = 2.22\text{ ppm}$$

EXAMPLE CALCULATIONS (RUNS)

Stack Exhaust Flow (Q_S) - RM19

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000}\right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}}\right)$$

$$Q_S = \frac{8{,}641.62\text{ SCF}}{\text{MMBtu}} \times \frac{2{,}588{,}030.23\text{ SCF}}{\text{hr}} \times \frac{996.32\text{ Btu}}{\text{SCF}}$$

$$\times \frac{\text{MMBtu}}{10^6\text{ Btu}} \times \left[\frac{20.90\%}{20.9\% - 13.1\ \%}\right] = 59{,}858{,}589.45\text{ SCFH}$$

Diluent-Corrected Pollutant Concentration, O_2 Based

RM 20, (11-26-02), 7.3.1 Correction of Pollutant Concentration Using O_2 Concentration. Calculate the O_2 corrected pollutant concentration, as follows: (calc for NOx gas, Run 1, if applicable)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

Eq. 20-4

$$C_{adj} = 2.22\text{ ppm} \times \left(\frac{20.9\% - 15.00\ \%}{20.9\% - 13.12\ \%}\right) = 1.68\text{ ppm@15\%}O_2$$

Diluent-Corrected Pollutant 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)

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

$$C_{ISO} = 1.68\text{ ppm@15\%}O_2 \times \left(\sqrt{\frac{\dfrac{273.9\text{ psig} + 14.69232\text{ psi}}{0.01933677\text{ psi/mm Hg.}}}{\dfrac{273.9\text{ psig} + 14.8721\text{ psi}}{0.01933677\text{ psi/mm Hg.}}}}\right) \times 2.718^{(19\times(0.006292\text{ lb/lb} - 0.00633))} \times \left(\frac{288\text{ K}}{294\text{ K}}\right)^{1.53} = 1.63\text{ ppm@15\% and ISO}$$

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)

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

$$E_{lb/hr} = \frac{2.22 \text{ ppm}}{10^6 \text{ ppm/part}} \times \frac{59{,}858{,}589 \text{ SCFH} \times 46.01 \text{ lb/lb-mol}}{385.23 \text{ SCF/lb-mol}} = \frac{15.86 \text{ lb}}{\text{hr}}$$

Emissions Rate (ton/year)

Calculation for tons per year emission rate based on 8760 hours per year. Calculate, as follows: (calc for NOx gas Run 1, if applicable)

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

$$E_{ton/yr} = \frac{15.86 \text{ lb}}{\text{hr}} \times \frac{8{,}760 \text{ hr}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lb}} = \frac{69.45 \text{ ton}}{\text{year}}$$

Emissions Rate (lb/MMBtu)

RM 19, (12-17-09), 12.2 Emission Rates of PM, SO_2, and NOx. Select from the following sections the applicable procedure to compute the PM, SO_2, or NOx emission rate (E) in ng/J (lb/million Btu). (calc for NOx gas Run 1, if applicable)

Oxygen Based

12.2.1 Oxygen-Based F Factor, Dry Basis. When measurements are on a dry basis for both O_2 (%O_2d) and pollutant (Cd) concentrations, use the following equation:

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}} \quad \text{Eq. 19-1}$$

$$E_{lb/MMBtu} = \frac{2.22 \text{ ppm} \times 8{,}641.62 \text{ SCF/MMBtu} \times 0.0000001194 \text{ lb/ppm*ft}^3 \times 20.9\%}{20.9\% - 13.12 \ \%} = \frac{0.006 \text{ lb}}{\text{MMBtu}}$$

Conversion Constant

Convc for NOx

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

$$Conv_c = \frac{\frac{46.01 \text{ lb}}{\text{lb•mole}} \times \frac{\text{lb•mole}}{385.23 \text{ SCF}}}{10^6} = \frac{0.0000001194 \text{ lb}}{\text{ppm-ft}^3}$$

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

EXAMPLE CALCULATIONS (Reference Method 1 - Circular Stack)

Diameter of Stack (in.)

$$D(in.) = L_{fw} - L_{nw}$$

D (in.) = 282.38 in. - 19.00 in. = 263.38 in.

Area of Stack (ft^2)

$$A_s(ft^2) = \pi \times \left(\frac{D}{2 \times 12}\right)^2$$

2

$$A_s\,(ft^2) = 3.14 \times \left(\frac{263.38\ in.}{2 \times 12in./ft}\right)^2 = 378.35\ ft^2$$

Stack Diameters Downstream

$$B_D(dia.) = \frac{B}{D}$$

$$B_D\,(dia.) = \frac{531.75\ in.}{263.38\ in.} = 2.02\ diameters$$

Stack Diameters Upstream

$$A_D(dia.) = \frac{A}{D}$$

$$A_D\,(dia.) = \frac{144.00\ in.}{263.38\ in.} = 0.55\ diameters$$

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

EXAMPLE CALCULATIONS (Reference Method 3a) [Values from Run 1 test]

Carbon Monoxide Concentration (%)

$$\%CO = \frac{ppmCO}{10{,}000}$$

$$\%CO\ (\%) = \frac{0.63 \quad \text{ppm}}{10{,}000\ \text{ppm}/\%} = 0.0000 \quad \%$$

Nitrogen Concentration (%)

$$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$$

$$\%N_2\ (\%) = 100 - \ 4.24 \quad \% - \ 13.12 \quad \% - \ 0.63 \quad / \ 10{,}000\ \% = \quad 82.64\ \%$$

Stack Dry Molecular Weight (lb/lb-mole)

$$M_d (lb/lb-mol) = \sum\left(\frac{MW_{comp}}{100} \times \%component\right)$$

$$M_d\ (\text{lb/lb-mol}) = \left(\frac{44\ \text{lb/lb-mol}}{100} \times \ 4.24 \quad \%\right) + \left(\frac{32\ \text{lb/lb-mol}}{100} \times \ 13.12 \quad \%\right) + \left(\frac{28\ \text{lb/lb-mol}}{100} \times \left[\frac{0.63}{10{,}000} + \ 82.64 \ \right]\right) = \frac{29.20\ \ \text{lb}}{\text{lb-mol}}$$

Stack Wet Molecular Weight (lb/lb-mole)

$$M_S (lb/lb-mol) = \left[M_d \times \left(1 - \frac{B_{WS}}{100}\right)\right] + \left[MW_{H_2O} \times \frac{B_{WS}}{100}\right]$$

$$M_S\ (\text{lb/lb-mol}) = \left\{\frac{29.20\ \ \text{lb}}{\text{lb-mol}} \times \left(1 - \frac{9.00 \quad \%}{100}\right)\right\} + \left\{\frac{18\ \text{lb}}{\text{lb-mol}} \times \frac{9.00 \quad \%}{100}\right\} = \frac{28.19\ \ \text{lb}}{\text{lb-mol}}$$

Average Calculated Fuel Factor (F_o)

$$F_{o(avg)} = \frac{\left[20.9 - (\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}{(\%CO_2)_{avg} + (\%CO)_{avg}}$$

$$F_{o(avg)} = \frac{20.9\% - \ 13.12 \quad \% - (0.5 \times \ 0.000 \quad \%)}{4.24 \quad \% \quad + \ 0.000 \quad \%} = \quad 1.830$$

Average Excess Air (%)

$$\%EA_{avg}(\%) = \frac{100 \times \left[(\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}{\left(0.264 \times (N_2)_{avg}\right) - \left[(\%O_2)_{avg} - \left(0.5 \times (\%CO)_{avg}\right)\right]}$$

$$(\%EA)_{AVG} = \frac{100 \times \{ \ 13.12 \quad \% - (0.5 \times \ 0.000 \quad \%)\}}{(\ 0.264 \times \ 82.64 \quad \%) - \{ \ 13.12 \quad \% - (0.5 \times \ 0.000 \quad \%)\}} = \quad 150.86 \quad \%$$

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

EXAMPLE CALCULATIONS (Reference Method 2) [Values from Run 1 test]

Absolute Stack Pressure (in. Hg)

$$P_S\,(in.Hg) = P_b + \frac{P_{static}}{13.6}$$

$$P_s\ (\text{in. Hg}) = 30.28\ \text{in. Hg} + \frac{0.75\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\text{/in. Hg}} = 30.34\ \text{in. Hg}$$

Average Stack Gas Velocity (ft/sec)

$$v_s(ft/\sec) = K_p \times C_p \times \left(\sqrt{\Delta p}\right)_{avg} \times \sqrt{\frac{(t_s)_{avg} + T_u}{P_s \times M_s}}$$

v_{sl} (ft/sec) =

$$\left(\frac{85.49\ \text{ft}}{\text{sec}}\ \frac{(\text{lb/lb-mol})(\text{in. Hg})}{(^{o}\text{R})(\text{in. } H_2O)}\right)^{1/2} \times\ 0.84\ \times\ 1.03\ \text{in.}H_2O^{1/2} \times \sqrt{\frac{276.33\ \ + 460\ ^{o}\text{R}}{30.34\ \text{in. Hg} \times 28.19\ \text{lb/lb-mol}}} = \frac{68.9\ \text{ft}}{\text{sec}}$$

Average Stack Dry Standard Flow Rate (dscfh)

$$Q_{sd}(dscfh) = \frac{60 \times 60 \times \left(1 - \frac{B_{ws}}{100}\right) \times v_s \times A_s \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sd}\ (\text{dscf/hr}) = \frac{3600\ \text{sec}}{\text{hr}} \times \left(1 - \frac{9.00\ \%}{100}\right) \times \frac{68.95\ \text{ft}}{\text{sec}} \times\ 378.35\ \text{ft}^2\ \times$$

$$\frac{68.00\ \ + 460\ ^{o}\text{R}}{276.33\ \ + 460\ ^{o}\text{R}} \times \frac{30.34\ \text{in. Hg}}{29.92\ \text{in. Hg}} = \frac{62{,}133{,}472.12\ \text{dscf}}{\text{hr}}$$

Average Stack Wet Flow Rate (acfm)

$$Q_{aw}(acfm) = 60 \times v_s \times A_s$$

$$Q_{aw}\ (\text{acf/min}) = \frac{60\ \text{sec}}{\text{min}} \times \frac{68.95\ \text{ft}}{\text{sec}} \times\ 378.35\ \text{ft}^2 = \frac{1{,}565{,}281.61\ \text{acf}}{\text{min}}$$

Average Stack Wet Standard Flow Rate (ascfh)

$$Q_{sw}(ascfh) = \frac{60 \times Q_{aw} \times T_{std} \times P_s}{(t_s + T_u) \times P_{std}}$$

$$Q_{sw}\ (\text{ascf/hr}) = \frac{60\ \text{min}}{\text{hr}} \times \frac{1{,}565{,}281.61\ \text{acf}}{\text{min}} \times$$

$$\frac{68.00\ \ + 460\ ^{o}\text{R}}{276.33\ \ + 460\ ^{o}\text{R}} \times \frac{30.34\ \text{in. Hg}}{29.92\ \text{in. Hg}} = \frac{68{,}279{,}087.60\ \text{ascf}}{\text{hr}}$$

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

EXAMPLE CALCULATIONS (Reference Method 4) [Values from Run 1 test]

Water Volume Weighed (scf)

$$V_{wsg(std)}(scf) = W_t \times K_5$$

$$V_{wsg(std)} = 96.00\ \text{g} \times 0.04715\ \text{ft}^3/\text{g} = 4.530\ \text{scf}$$

Standard Meter Volume (dscf)

$$V_{m(std)}(dscf) = \frac{K_1 \times Y \times V_m \times \left(P_b + \frac{\Delta H_{avg}}{13.6}\right)}{(t_m)_{avg} + T_u}$$

$$V_{m(std)} = \frac{\frac{17.65\ ^{\circ}\text{R}}{\text{in. Hg}} \times 0.99 \times 46.88\ \text{dcf} \times \left(30.28\ \text{in. Hg} + \frac{1.98\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\ /\ \text{in. Hg}}\right)}{85.08\ ^{\circ}\text{F} + 460\ ^{\circ}\text{R}} = 45.76\ \text{dscf}$$

Calculated Moisture Content (%)

$$B_{ws(calc)}(\%) = 100 \times \frac{V_{wsg(std)}}{V_{wsg(std)} + V_{m(std)}}$$

$$B_{ws(calc)} = 100 \times \frac{4.53\ \text{dscf}}{4.53\ \text{dscf} + 45.76\ \text{dscf}} = 9.00\ \%$$

Saturated Moisture Content (%)

$$B_{ws(svp)}(\%) = 100 \times \frac{10^{6.691 - \frac{3144}{t_{s(avg)} + 390.86}}}{P_b + \frac{P_{static}}{13.6}} \leq 100$$

$$B_{ws(svp)} = 100 \times \frac{10^{\left(6.691 - \frac{3144}{276.33\ ^{\circ}\text{F} + 390.86}\right)}}{30.28\ \text{in. Hg} + \frac{0.75\ \text{in. } H_2O}{13.6\ \text{in. } H_2O\ /\ \text{in. Hg}}} \leq 100 = 100.00\ \%$$

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

EXAMPLE CALCULATIONS (Isokinetic Sampling) [Values from Run 1 test]

Desired Orifice (in. H_2O) (first point)

$$\Delta H_d (in.H_2O) = K \times \Delta p$$

ΔH_d (in. H_2O) = 1.85 x 0.77 in. H_2O = 1.43 in. H_2O

Absolute Meter Pressure (in. Hg)

$$P_m (in.Hg) = P_b + \frac{\Delta H@}{13.6}$$

$$P_m \text{ (in. Hg)} = 30.28 \text{ in. Hg} + \frac{1.75 \text{ in. } H_2O}{13.6 \text{ in. } H_2O\text{/in. Hg}} = 30.41 \text{ in. Hg}$$

Recommended Nozzle Diameter (in.)

$$D_{ni}(in.) = \sqrt{\frac{C_n \times Q_m \times P_m}{(t_m + T_n) \times C_p} \times \left(\frac{1 - \frac{B_{wm}}{100}}{1 - \frac{B_{ws}}{100}}\right) \times \sqrt{(t_s + T_n) \times \left[\frac{M_d \times \left(1 - \frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}{P_s \times \Delta p_{avg}}\right]}}$$

$$D_{ni} \text{ (in.)} = \sqrt{\frac{\frac{0.03575 \text{ (lb-mole•°R•in. } H_2O)^{1/2}\text{•min•in.}^2}{\text{acf•in. Hg}^{3/4}\text{•lb}^{1/2}} \times 0.75 \text{ acf} \times 30.41 \text{ in. Hg}}{\left[85.08 \text{ °F} + 460\text{°R}\right] \times 0.84} \times \left(\frac{1 - \frac{0.00 \ \%}{100}}{1 - \frac{9.00 \ \%}{100}}\right) \times \sqrt{(276.33 \text{ °F} + 460\text{°R}) \times \frac{\frac{29.20 \text{ lb}}{\text{lb-mole}} \times \left(1 - \frac{9.00 \ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{9.00 \ \%}{100}\right)}{30.34 \text{ in. Hg} \times 1.03 \text{ in. } H_2O}}} = 0.210 \text{ in.}$$

ΔP to ΔH Isokinetic Factor

$$K = C_k \times C_p^2 \times \Delta H@ \times D_{na}^4 \times \left[\frac{M_d \times \left(1 - \frac{B_{wm}}{100}\right) + \left(18 \times \frac{B_{wm}}{100}\right)}{M_d \times \left(1 - \frac{B_{ws}}{100}\right) + \left(18 \times \frac{B_{ws}}{100}\right)}\right] \times \left(\frac{1 - \frac{B_{ws}}{100}}{1 - \frac{B_{wm}}{100}}\right)^2 \times \left(\frac{t_m + T_n}{ts + T_n}\right) \times \frac{P_s}{P_m}$$

$$K = \frac{849.8}{\text{in. } H_2O\text{•in.}^4} \times 0.84^2 \times 1.75 \text{ in. } H_2O \times 0.23^4 \times \left(\frac{1 - \frac{9.00 \ \%}{100}}{1 - \frac{0.00 \ \%}{100}}\right)^2 \times \frac{85.08 \text{ °F} + 460\text{°R}}{276.33 \text{ °F} + 460\text{°R}}) \times$$

$$\left(\frac{\frac{29.20 \text{ lb}}{\text{lb/mole}} \times \left(1 - \frac{0.00 \ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{0.00 \ \%}{100}\right)}{\frac{29.20 \text{ lb}}{\text{lb/mole}} \times \left(1 - \frac{9.00 \ \%}{100}\right) + \left(\frac{18 \text{ lb}}{\text{lb-mol}} \times \frac{9.00 \ \%}{100}\right)} \times \frac{30.34 \text{ in. Hg}}{30.41 \text{ in. Hg}} = 1.85$$

Cumulative Percent Isokinetic (%) (first point)

$$I(\%) = \frac{K_4 \times \left((t_s)_{avg} + T_n\right) \times V_{m(std)}}{\left(\Theta \times \left(v_{s(l)}\right)_{avg} \times P_s \times \pi \times \left(\frac{D_{na}}{2} \times \frac{1}{12}\right)^2\right) \times \left(1 - \frac{B_{ws}}{100}\right)}$$

$$I (\%) = \frac{\frac{0.0945 \text{ min•in. Hg}}{\text{sec•°R}} \times (271.00 \text{ °F} + 460 \text{ °R}) \times 1.74 \text{ dscf}}{2.50 \text{ min} \times \frac{58.26 \text{ ft}}{\text{sec}} \times 30.34 \text{ in. Hg} \times 3.14 \times \left(\frac{0.23 \text{ in.}}{2} \times \frac{\text{ft.}}{12 \text{ in.}}\right)^2 \times \left(1 - \frac{9.00 \ \%}{100}\right)} = 103.63 \ \%$$

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

EXAMPLE CALCULATIONS (CTM-027 Ammonia Analysis) [Values from Run 1 test]

Dry Gas Meter Volume (L)

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

V_m (L) = 45.76 dscf x 28.31685 L/dscf = 1295.86 L

Volume of NH_3 (L)

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

V_a (L) =

$$\left(\frac{10.30\ \text{mg}}{\text{L}} \times \frac{200.00\ \text{ml}}{1} \times \frac{\text{L}}{1000\ \text{ml}} \times \frac{22.4\ \text{L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03\ \text{g}} \times \frac{\text{g}}{1000\ \text{mg}}\right) +$$

$$\left(\frac{0.20\ \text{mg}}{\text{L}} \times \frac{180.00\ \text{ml}}{1} \times \frac{\text{L}}{1000\ \text{ml}} \times \frac{22.4\ \text{L ideal gas}}{\text{g-mol substance}} \times \frac{\text{g-mol } NH_3}{17.03\ \text{g}} \times \frac{\text{g}}{1000\ \text{mg}}\right) = 0.00276\ \text{L}$$

NH_3 Concentration (ppmvd)

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

$$C_{NH3}\ (\text{ppmvd}) = \frac{0.00\ \text{L}}{1295.86\ \text{L}} \times 10^6 = 2.13\ \text{ppmvd}$$

NH_3 Concentration (ppmvd@15%O_2)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

$$C_{adj} = 2.13\ \text{ppmvd} \times \left(\frac{20.9\% - 15.00\ \%}{20.9\% - 13.1\ \%}\right) = 1.61\ \text{ppmvd@15\%}O_2$$

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

Nomenclature

- $\%CO$ = carbon monoxide concentration (%)
- $\%CO_2$ = carbon dioxide concentration (%)
- $\%N_2$ = nitrogen concentration (%)
- $\%O_2$ = oxygen concentration (%)
- $\%O_{2,wet}$ = Oxygen content of gas stream, % by volume of wet gas. (Note: The oxygen percentage used in Method 201A, Equation 3 is on a wet gas basis. That means that since oxygen is typically measured on a dry gas basis, the measured percent O2 must be multiplied by the quantity $(1 - B_{ws})$ to convert to the actual volume fraction. Therefore, $\%O_{2,wet} = (1 - B_{ws}) * \%O_{2,\,dry}$)

- $(\%EA)_{avg}$ = average excess air (%)
- $(F_o)_{avg}$ = average calculated fuel factor
- $[(\Delta p)^{0.5}]_{avg}$ = Average of square roots of the velocity pressures measured during the preliminary traverse, inches W.C.
- μ = Gas viscosity, micropoise
- 12.0 = Constant calculated as 60 percent of 20.5 square inch cross-sectional area of combined cyclone head, square inches

- 17.03 = mg/milliequivalents for ammonium ion
- 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)
- 5.02×10^4 = constant derived from the molecular weight and correcting standard temperature and pressure (ref. Bay Area Air Quality Management District, Source Test Procedure ST-1B, Ammonia Integrated Sampling, Adopted January 20, 1982, Regulation 7-303)

- A = distance upstream (in.)
- A_D = stack diameters upstream (dia.)
- An = Area of nozzle, square feet
- A_s = area of stack (ft^2)
- B = distance downstream (in.)
- B_D = stack diameters downstream (dia.)
- b_f = Average blockage factor calculated in Equation 26, dimensionless
- B_{wm} = meter moisture content (%)
- B_{ws} = stack moisture content (%)
- C = Cunningham correction factor for particle diameter, Dp, and calculated using the actual stack gas temperature, dimensionless

- C_1 = -150.3162 (micropoise)
- C_2 = 18.0614 (micropoise/$K^{0.5}$) = 13.4622 (micropoise/$R^{0.5}$)
- C_3 = 1.19183×10^6 (micropoise/K^2) = 3.86153×10^6 (micropoise/R^2)
- C_4 = 0.591123 (micropoise)
- C_5 = 91.9723 (micropoise)
- C_6 = 4.91705×10^{-5} (micropoise/K^2) = 1.51761×10^{-5} (micropoise/R^2)
- C_a = Acetone blank concentration, mg/mg
- C_b = Concentration of NH3 ion in the back half of train (breakthrough)
- C_f = Concentration of NH3 ion in the front half of train (main catch)
- C_{fPM10} = Conc. of filterable PM_{10}, gr/dscf
- $C_{fPM2.5}$ = Conc. of filterable $PM_{2.5}$, gr/dscf
- C_k = K Factor Constant, 849.8

Nomenclature

- C_n = nozzle diameter constant, 0.03575
- C_p' = Coefficient for the pitot used in the preliminary traverse, dimensionless
- C_p = Pitot coefficient for the combined cyclone pitot, dimensionless
- C_{cpm} = Concentration of the condensable PM in the stack gas, dry basis, corrected to standard conditions, milligrams/dry standard cubic foot.
- C_r = Re-estimated Cunningham correction factor for particle diameter equivalent to the actual cut size diameter and calculated using the actual stack gas temperature, dimensionless
- D_{50} = Particle cut diameter, micrometers
- $D_{50(N+1)}$ = D_{50} value for cyclone IV calculated during the N+1 iterative step, micrometers
- D_{50-1} = Re-calculated particle cut diameters based on re-estimated C_r, micrometers
- D_{50LL} = Cut diameter for cyclone I corresponding to the 2.25 micrometer cut diameter for cyclone IV, micrometer
- D_{50N} = D_{50} value for cyclone IV calculated during the Nth iterative step, micrometers
- D_{50T} = Cyclone I cut diameter corresponding to the middle of the overlap zone shown in Method 201A, Figure 10 of Section 17, micrometers
- D_e = equivalent stack diameter (in.)
- ΔH@ = ΔH @ 0.75 scfm (in. H2O)
- ΔH_{avg} = average orifice pressure (in. H_2O)
- D_n = Inner diameter of sampling nozzle mounted on Cyclone I, inches
- D_{na} = actual nozzle diameter (in.)
- D_p = Physical particle size, micrometers
- Δp = velocity head (in. H_2O)
- Δp_1 = velocity head at first current traverse point (in. H_2O)
- $\Delta p'_1$ = velocity head at first preliminary traverse point (in. H_2O)
- Δp_{avg} = average pitot tube differential pressure (in. H_2O)
- Δp_n = velocity head at subsequent current traverse point (in. H_2O)
- Δp_{RM2} = method 2 velocity head (in. H_2O)
- D_s = diameter of stack (in.)
- F_d = fuel f-factor (dscf/MMBtu)
- f_{O2} = stack gas fraction of O_2, by volume, dry basis
- I = Percent isokinetic sampling, dimensionless
- K_1 = standard volume correction, 17.65°R/in. Hg
- K_4 = isokinetic conversion constant, 0.0945min•in.Hg/sec•°R
- K_5 = water mass to std water vapor, 0.04715 ft^3/g
- K_p = 85.49, ((ft/sec)/(pounds/mole -°R))
- L = length of stack (in.)
- L_{fw} = distance to far wall of stack (in.)
- L_{nw} = distance to near wall of stack (in.) [reference]
- $m_{\#x}$ = weight measurements (g)
- M_1 = Milligrams of PM collected on the filter, less than or equal to 2.5 micrometers
- M_2 = Milligrams of PM recovered from Container #2 (acetone blank corrected), greater than 10 micrometers
- M_3 = Milligrams of PM recovered from Container #3 (acetone blank corrected), less than or equal to 10 and greater than 2.5 micrometers

Nomenclature

- M_4 = Milligrams of PM recovered from Container #4 (acetone blank corrected), less than or equal to 2.5 micrometers
- m_a = Mass of residue of acetone after evaporation, mg
- m_c = Mass of the NH4+ added to sample to form ammonium sulfate, mg
- m_{cpm} = Mass of the total condensable PM, mg
- M_d = Molecular weight of dry gas, pounds/pound mole
- m_{fb} = Mass of total CPM in field train recovery blank, mg
- m_{fx} = final weight, avg of last two measurements (g)
- mg = Milligram
- mg/L = Milligram per liter
- m_i = Mass of inorganic CPM, mg
- m_{ib} = Mass of inorganic CPM in field train recovery blank, mg
- M_n = total particulates (mg)
- m_o = Mass of organic CPM, mg
- m_{ob} = Mass of organic CPM in field train blank, mg
- m_r = Mass of dried sample from inorganic fraction, mg
- m_{tx} = tare weight (g)
- MW = molecular weight (lb/lb-mole)
- M_w = Molecular weight of wet gas, pounds/pound mole
- N = Normality of ammonium hydroxide titrant
- N_a = null angle (deg.)
- N_{re} = Reynolds number, dimensionless
- N_{tp} = Number of iterative steps or total traverse points
- P_b = P_{bar} = barometric pressure (in. Hg)
- P_{bar} = barometric pressure (in. Hg)
- ppmCO = carbon monoxide concentration (ppm)
- ppmv = Parts per million by volume
- ppmw = Parts per million by weight
- P_s = absolute stack pressure (in. Hg)
- P_{static} = static pressure (in. H_2O)
- P_{std} = standard pressure, 29.92 in. Hg
- Θ = total sampling time (min)
- Q_{aw} = average stack wet flow rate (ascf/min)
- Q_I = Sampling rate for cyclone I to achieve specified D_{50}
- Q_m = estimated orifice flow rate, 0.750 acfm, else Vm/Q from previous run
- Q_s = Sampling rate for cyclone I to achieve specified D_{50}
- $Q_{s(std)}$ = total cyclone flow rate at standard conditions (dscf/min)
- Q_{sd} = dry standard stack flow rate (dscfm)
- Q_{sST} = Dry gas sampling rate through the sampling assembly, dscfm
- Q_{sw} = wet standard stack flow rate (ascfm)
- R_{max} = Nozzle/stack velocity ratio parameter, dimensionless
- R_{min} = Nozzle/stack velocity ratio parameter, dimensionless
- t_1 = Sampling time at point 1, min
- t_m = average gas meter temperature (^oF)

Nomenclature

- t_m = average meter temperature (^oF)
- T_m = Meter box and orifice gas temperature, ^oR
- t_n = Sampling time at point n, min
- t_r = Total projected run time, min
- T_s = Absolute stack gas temperature, ^oR
- T_{std} = standard temperature, 68°F, 528°R
- T_u = absolute temperature offset, 460°R
- V_a = Volume of acetone blank, ml
- V_{aw} = Volume of acetone used in sample recovery wash, ml
- V_b = Volume of aliquot taken for IC analysis, ml
- V_c = Quantity of water captured in impingers and silica gel, ml
- V_f = final impinger volume (ml)
- V_i = initial impinger volume (ml)
- V_{ic} = Volume of impinger contents sample, ml
- V_m = Dry gas meter volume sampled, acf
- $V_{m(std)}$ = standard meter volume (dscf)
- v_{max} = Maximum gas velocity calculated from Equations 18 or 19, ft/sec
- v_{max} = maximum nozzle velocity (ft/sec)
- V_{mf} = final dry gas meter reading (dcf)
- V_{mi} = initial dry gas meter reading (dcf)
- v_{min} = Minimum gas velocity calculated from Method 201A, Equations 16 or 17, ft/sec
- V_{ms} = Dry gas meter volume sampled, corrected to standard conditions, dscf
- v_n = Sample gas velocity in the nozzle, ft/sec
- v_{org} = organics wash volume (ml)
- V_p = Volume of water added during train purge
- v_s = average stack gas velocity (ft/sec)
- v_{sl} = local velocity (ft/sec)
- V_t = total impinger volume (ml) = ;(V_f-V_i)
- V_t = Volume of NH4OH titrant, ml
- $V_{w(std)}$ = volume of water vapor in gas sample at standard conditions (scf)
- v_x = blank volume (ml)
- W = width of stack (in.)
- $W_{2,3,4}$ = Weight of PM recovered from Containers #2, #3, and #4, mg
- W_a = Weight of blank residue in acetone used to recover samples, mg
- W_f = final impinger weight (g)
- W_i = initial impinger weight (g)
- W_t = total impinger weight (g) = ;(W_f-W_i)
- w_x = blank weight of solids (g)
- Y = meter calibration factor (a.k.a gamma)
- Z = Ratio between estimated cyclone IV D_{50} values, dimensionless
- γ = Dry gas meter gamma value, dimensionless
- ΔH = Meter box orifice pressure drop, inches W.C.
- $\Delta H@$ = Pressure drop across orifice at flow rate of 0.75 scfm at standard conditions, inches W.C. (Note: Specific to each orifice and meter box.)

Nomenclature

- Δp_1 = Velocity pressure measured at point 1, inches W.C.
- Δp_{avg} = Average velocity pressure, inches W.C.
- Δp_m = Observed velocity pressure using S-type pitot tube in preliminary traverse, inches W.C.
- Δp_{max} = Maximum velocity pressure, inches W.C.
- Δp_{min} = Minimum velocity pressure, inches W.C.
- Δp_n = Velocity pressure measured at point n during the test run, inches W.C.
- Δp_s = Velocity pressure calculated in Method 201a, Equation 25, inches W.C.
- Δp_{s1} = Velocity pressure adjusted for combined cyclone pitot tube, inches W.C.
- Δp_{s2} = Velocity pressure corrected for blockage, inches W.C.
- θ = Total run time, min
- ρ_a = Density of acetone, mg/ml (see label on bottle)
- Σ_n = total number of sampling points

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_{WS} = 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_{Dir} = 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 NOx measured in the spiked sample.
C_{Spike} = Concentration of NOx in the undiluted spike gas.
C_{Calc} = Calculated concentration of NOx 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} = NO_2 to NO converter efficiency, percent.
H = High calibration gas, designator.
L = Low calibration gas, designator.
M = Mid calibration gas, designator.
NOFinal = The average NO concentration observed with the analyzer in the NO mode during the converter efficiency test in Section 16.2.2.
NOxCorr = The NOx concentration corrected for the converter efficiency.
NOxFinal = The final NOx concentration observed during the converter efficiency test in Section 16.2.2.
NOxPeak = The highest NOx concentration observed during the converter efficiency test in Section 16.2.2.
Q_{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 H_2O/g air
e = transcendental constant, 2.718
T_a = ambient temperature, K

Small Engine and FTIR Nomenclature. The terms used in the equations are defined as follows:

bhp = *brake horsepower*
hp = horsepower
Q_{sys} = system flow (lpm)
Q_m = matrix spike flow (lpm)

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_{ao}, E_{ai} = Average pollutant rate of the control device, outlet and inlet, respectively, for the performance test period, ng/J (lb/million Btu).
E_{bi} = Pollutant rate from the steam generating unit, ng/J (lb/million Btu).
E_{bo} = Pollutant emission rate from the steam generating unit, ng/J (lb/million Btu).
E_{ci} = Pollutant rate *in* combined effluent, ng/J (lb/million Btu).
E_{co} = Pollutant emission rate in combined *effluent*, ng/J (lb/million Btu).
E_d = Average pollutant rate for each sampling period (e.g.,24-hr Method 6B sample or 24-hr fuel sample) or for each fuel lot (e.g., amount of fuel bunkered), ng/J (lb/million Btu).
E_{di} = Average inlet SO_2 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 (lbs/million Btu) or ppm corrected to 7 percent O_2.
E_{jo},E_{ji} = Matched pair hourly arithmetic average pollutant rate, outlet and inlet, respectively, ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
E_h = Hourly average pollutant, ng/J (lb/million Btu).
E_{hj} = Hourly arithmetic average pollutant rate for hour "j," ng/J (lb/million Btu) or ppm corrected to 7 percent O_2.
EXP = Natural logarithmic base (2.718) raised to the value enclosed by brackets.
Fc = Ratio of the volume of carbon dioxide produced to the gross calorific value of the fuel from Method 19
F_d, F_w, F_c = Volumes of combustion components per unit of heat content, scm/J (scf/million Btu).
ft^3 = cubic feet
G = ideal gas conversion factor
(385.23 SCF/lb-mol at 68 deg F & 14.696 psia)
GCM = gross Btu per SCF (constant, compound based)
GCV = Gross calorific value of the fuel consistent with the ultimate analysis, kJ/kg (Btu/lb).
GCV_p, GCV_r = Gross calorific value for the product and raw fuel lots, respectively, dry basis, kJ/kg (Btu/lb).
$\%_H$ = Concentration of hydrogen from an ultimate analysis of fuel, weight percent.
H_b = Heat input rate to the steam generating unit from fuels fired in the steam generating unit, J/hr (million Btu/hr).
H_g = Heat input rate to gas turbine from all fuels fired in the gas turbine, J/hr (million Btu/hr).
$\%_{H2O}$ = Concentration of water from an ultimate analysis of fuel, weight percent.
H_r = Total numbers of hours in the performance test period (e.g., 720 hours for 30-day performance test period).
K = volume of combustion component per pound of component (constant)
K = Conversion factor, 10^{-5} (kJ/J)/(%) [10^6 Btu/million Btu].
K_c = (9.57 scm/kg)/% [(1.53 scf/lb)/%].
K_{cc} = (2.0 scm/kg)/% [(0.321 scf/lb)/%].
K_{hd} = (22.7 scm/kg)/% [(3.64 scf/lb)/%].
K_{hw} = (34.74 scm/kg)/% [(5.57 scf/lb)/%].
K_n = (0.86 scm/kg)/% [(0.14 scf/lb)/%].
K_c = (2.85 scm/kg)/% [(0.46 scf/lb)/%].
K_c = (3.54 scm/kg)/% [(0.57 scf/lb)/%].
K_{sulfur} = $2x10^4$ Btu/wt%-MMBtu
K_w = (1.30 scm/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 = barometirc pressure, in Hg
P_s = Potential SO2 emissions, percent.
$\%_S$ = Sulfur content of as-fired fuel lot, dry basis, weight percent.
S_e = 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_e = 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, 7*th* Ed.)
X_{CO2}=CO_2 Correction factor, percent.
X_k = Fraction of total heat input from each type of fuel k.

Calculations, Formulas, and Constants

The following information supports the spreadsheets for this testing project.

Given Data:

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

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

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

ASTM D 3588

Molecular Weight of NOx (lb/lb-mole) = 46.01
Molecular Weight of CO (lb/lb-mole) = 28.00
Molecular Weight of SO_2 (lb/lb-mole) = 64.00
Molecular Weight of THC (propane) (lb/lb-mole) = 44.00
Molecular Weight of VOC (methane) (lb/lb-mole) = 16.00
Molecular Weight of NH_3 (lb/lb-mole) = 17.03
Molecular Weight of HCHO (lb/lb-mole) = 30.03

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

Conversion Constant for NOx = 0.0000001194351
Conversion Constant for CO = 0.0000000726839
Conversion Constant for SO_2 = 0.0000001661345
Conversion Constant for THC = 0.0000001142175
Conversion Constant for VOC (methane) = 0.0000000415336
Conversion Constant for NH_3 = 0.0000000442074
Conversion Constant for HCHO = 0.0000000779534
NOTE: units are lb/ppm*ft^3

Formulas:

1. Corrected Raw Average (C_{Gas}), 40CFR60, App. A, RM 7E, Eq. 7E-5 (08/15/06)

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

2. Correction to % O_2, 40CFR60, App. A, RM 20, Eq. 20-5 (11/26/02)

$$C_{adj} = C_{Gas(Target)} \times \left(\frac{20.9\% - AdjFactor}{20.9\% - C_{Gas(O2)}}\right)$$

3. Correction to % O_2 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)

$$Q_S = \left(\frac{FFactor \times Q_f \times HHV}{1{,}000{,}000}\right) \times \left(\frac{20.9\%}{20.9\% - C_{Gas(O2)}}\right)$$

5. Emission Rate in lb/hr

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

6. Emission Rate in tons per year

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

7. Emission Concentration in lb/MMBtu (O_2 based)

$$E_{lb/MMBtu} = \frac{C_{Gas} \times F_d Factor \times Conv_C \times 20.9\%}{20.9\% - C_{Gas(O2)}}$$

8. Emission Concentration in g/hp*hr

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

RATA SHEET CALCULATIONS

d = Reference Method Data - CEMS Data
S_d = Standard Deviation
CC = Confident Coefficient
n = number of runs
$t_{0.025}$ = 2.5 percent confidence coefficent T-values
RA = relative accuracy
ARA = alternative relative accuracy
BAF = Bias adjustment factor

n	t	n	t	n	t
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.262	15	2.145
6	2.571	11	2.228	16	2.131

1. Difference

$$d = \sum_{i=1}^{n} d_i$$

2. Standard Deviation

$$S_d = \sqrt{\frac{\sum_{i=1}^{n} d_i^2 - \left[\frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}\right]}{n-1}}$$

3. Confident Coefficient

$$CC = t_{0.025} \times \frac{S_d}{\sqrt{n}}$$

4. Relative Accuracy

$$RA = \frac{\left|d_{AVG}\right| + \left|CC\right|}{RM_{AVG}} \times 100$$

5. Alternative Relative Accuracy

$$ARA = \frac{\left|d_{AVG}\right| + \left|CC\right|}{AS} \times 100$$

5. Bias Adjustment Factor

$$BAF = 1 + \left(\frac{\left|d_{AVG}\right|}{CEM_{AVG}}\right)$$

APPENDIX B

UNIT OPERATION PARAMETERS

Florida Power and Light

Air Permit # :	PSD-FL-396
Plant Name or Location:	West County Energy Center
Date:	March 12-13, 2011
Project Number:	bv-10-westcounty.fl-comp#2
Manufacturer & Equipment:	Mitsubishi
Model:	501G
Unit Number:	3C
Test Load:	Base/Base w/DB
Tester(s) / Test Unit(s):	JF/AS/RW/TG/127/206

		RUN					
	UNITS	**1-1**	**1-2**	**1-3**	**2-1**	**2-2**	**2-3**
Start Time	hh:mm:ss	11:08:07	12:37:07	14:04:07	09:56:07	11:12:01	12:27:01
End Time	hh:mm:ss	12:07:37	13:36:37	15:03:37	10:55:37	12:11:31	13:26:31
Bar. Pressure	in. Hg	30.28	30.26	30.28	30.28	30.30	30.30
Amb. Temp.	°F	70	73	72	72	74	74
Rel. Humidity	%	41	42	40	42	36	36
Spec. Humidity	lb water / lb air	0.006292	0.007150	0.006573	0.006905	0.006321	0.006321
Date	mm/dd/yy	03/12/11	03/12/11	03/12/11	03/13/11	03/13/11	03/13/11
Load Designator		Base	Base	Base	Base w/DB	Base w/DB	Base w/DB
Comb. Inlet Pres.	psig	273.9	272.2	271.1	274.0	273.2	271.8
NH_3 Injection Rate	lb/hr	264.6	259.0	254.7	278.1	274.5	272.5
Turbine Fuel Flow	lb/min	1,860	1,851	1,847	1,872	1,862	1,851
Duct Burner Fuel Flow	lb/min	0	0	0	159	159	159
Total Fuel Flow	SCFH	2,588,030	2,576,145	2,570,955	2,826,831	2,812,535	2,796,666
Stack Moisture	% Method 4	9.0	9.3	8.9	9.5	9.7	9.9
Heat Input	MMBtu/hr	2322.9	2312.2	2307.6	2520.4	2507.6	2493.5
Power Output	megawatts	255.0	252.6	251.2	254.9	253.9	251.8

UNIT OPERATION PARAMETERS

Base Load

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT C PPH
12-Mar-11 11:08:00	275.39	112.78	0.00	257.71	275.36
12-Mar-11 11:09:00	275.44	111.66	0.00	257.51	281.82
12-Mar-11 11:10:00	275.27	112.92	0.00	256.31	286.87
12-Mar-11 11:11:00	274.63	113.51	0.00	256.59	277.03
12-Mar-11 11:12:00	274.85	111.83	0.00	255.74	277.15
12-Mar-11 11:13:00	275.21	111.18	0.00	256.35	267.98
12-Mar-11 11:14:00	273.78	111.28	0.00	256.22	259.86
12-Mar-11 11:15:00	273.74	111.94	0.00	255.13	274.69
12-Mar-11 11:16:00	274.16	112.15	0.00	253.90	282.99
12-Mar-11 11:17:00	274.01	112.84	0.00	255.05	253.65
12-Mar-11 11:18:00	274.47	111.13	0.00	255.72	247.75
12-Mar-11 11:19:00	274.45	111.94	0.00	256.03	261.17
12-Mar-11 11:20:00	275.16	113.50	0.00	256.82	267.66
12-Mar-11 11:21:00	275.04	112.95	0.00	256.53	271.01
12-Mar-11 11:22:00	274.56	112.18	0.00	257.07	265.57
12-Mar-11 11:23:00	274.13	111.31	0.00	255.66	272.12
12-Mar-11 11:24:00	273.21	112.40	0.00	253.52	283.82
12-Mar-11 11:25:00	273.31	111.74	0.00	253.42	261.04
12-Mar-11 11:26:00	274.76	111.36	0.00	255.28	247.42
12-Mar-11 11:27:00	274.65	110.51	0.00	255.47	246.92
12-Mar-11 11:28:00	274.42	112.12	0.00	256.12	259.14
12-Mar-11 11:29:00	274.29	113.05	0.00	256.20	266.31
12-Mar-11 11:30:00	273.88	111.63	0.00	254.66	281.23
12-Mar-11 11:31:00	274.67	110.83	0.00	255.61	261.11
12-Mar-11 11:32:00	274.76	111.90	0.00	255.88	267.03
12-Mar-11 11:33:00	274.74	113.13	0.00	256.21	265.60
12-Mar-11 11:34:00	274.77	112.14	0.00	256.88	266.04
12-Mar-11 11:35:00	273.87	111.23	0.00	255.78	277.53
12-Mar-11 11:36:00	273.27	111.32	0.00	254.10	285.64
12-Mar-11 11:37:00	273.68	111.86	0.00	253.61	271.26
12-Mar-11 11:38:00	273.48	112.40	0.00	255.06	258.97
12-Mar-11 11:39:00	273.32	110.87	0.00	255.06	263.43
12-Mar-11 11:40:00	273.68	110.85	0.00	253.47	270.60
12-Mar-11 11:41:00	274.19	110.87	0.00	254.05	264.08
12-Mar-11 11:42:00	273.73	112.25	0.00	254.52	247.81
12-Mar-11 11:43:00	273.66	112.57	0.00	255.50	254.47
12-Mar-11 11:44:00	274.20	111.68	0.00	255.96	264.16
12-Mar-11 11:45:00	273.87	110.41	0.00	254.60	271.36
12-Mar-11 11:46:00	273.49	111.76	0.00	254.75	264.55
12-Mar-11 11:47:00	273.25	112.19	0.00	254.63	259.41
12-Mar-11 11:48:00	273.08	111.39	0.00	253.80	261.21
12-Mar-11 11:49:00	273.10	109.56	0.00	252.85	266.40
12-Mar-11 11:50:00	272.80	110.60	0.00	253.97	242.63
12-Mar-11 11:51:00	272.73	111.31	0.00	254.45	248.71
12-Mar-11 11:52:00	272.25	111.46	0.00	252.54	265.28
12-Mar-11 11:53:00	273.27	111.57	0.00	253.48	249.20
12-Mar-11 11:54:00	273.17	110.25	0.00	254.51	246.34
12-Mar-11 11:55:00	273.39	110.14	0.00	254.12	255.38
12-Mar-11 11:56:00	273.82	110.39	0.00	253.45	257.85
12-Mar-11 11:57:00	274.12	112.41	0.00	255.39	248.92
12-Mar-11 11:58:00	274.00	110.55	0.00	255.56	259.64
12-Mar-11 11:59:00	273.69	111.13	0.00	254.66	268.75
12-Mar-11 12:00:00	273.29	111.27	0.00	252.98	275.53
12-Mar-11 12:01:00	273.47	111.08	0.00	254.03	262.04
12-Mar-11 12:02:00	273.58	110.18	0.00	254.70	246.31
12-Mar-11 12:03:00	274.18	111.19	0.00	255.15	261.76
12-Mar-11 12:04:00	273.38	112.11	0.00	255.44	266.37
12-Mar-11 12:05:00	272.55	111.27	0.00	253.55	276.18
12-Mar-11 12:06:00	272.91	109.22	0.00	251.68	279.64
12-Mar-11 12:07:00	273.12	111.64	0.00	253.01	253.91
Average	273.92	111.58	0.00	254.97	264.56

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT C PPH
12-Mar-11 12:37:00	272.93	110.75	0.00	252.92	262.49
12-Mar-11 12:38:00	273.14	111.55	0.00	253.38	257.12
12-Mar-11 12:39:00	273.21	110.84	0.00	254.70	248.48
12-Mar-11 12:40:00	273.04	110.74	0.00	253.52	264.47
12-Mar-11 12:41:00	272.70	111.83	0.00	253.61	256.06
12-Mar-11 12:42:00	272.27	110.38	0.00	253.09	262.67
12-Mar-11 12:43:00	271.81	110.44	0.00	251.82	265.40
12-Mar-11 12:44:00	271.56	111.24	0.00	251.87	252.39
12-Mar-11 12:45:00	271.86	110.55	0.00	252.42	242.93
12-Mar-11 12:46:00	272.51	109.58	0.00	251.82	247.22
12-Mar-11 12:47:00	272.78	111.74	0.00	253.30	237.96
12-Mar-11 12:48:00	272.83	111.37	0.00	253.93	250.77
12-Mar-11 12:49:00	271.90	111.11	0.00	253.53	258.03
12-Mar-11 12:50:00	271.58	111.46	0.00	251.63	272.51
12-Mar-11 12:51:00	272.16	109.57	0.00	251.33	264.93
12-Mar-11 12:52:00	272.71	110.80	0.00	252.34	252.67
12-Mar-11 12:53:00	272.92	112.12	0.00	253.17	255.28
12-Mar-11 12:54:00	272.85	111.37	0.00	253.84	262.37
12-Mar-11 12:55:00	272.89	111.78	0.00	254.35	271.48
12-Mar-11 12:56:00	272.38	111.88	0.00	252.47	286.22
12-Mar-11 12:57:00	271.96	110.15	0.00	252.29	274.62
12-Mar-11 12:58:00	272.30	111.77	0.00	252.68	266.28
12-Mar-11 12:59:00	271.70	111.15	0.00	252.60	265.78
12-Mar-11 13:00:00	271.83	109.77	0.00	251.93	264.81
12-Mar-11 13:01:00	271.66	111.58	0.00	251.25	267.04
12-Mar-11 13:02:00	271.55	111.12	0.00	252.04	256.31
12-Mar-11 13:03:00	271.73	109.91	0.00	252.60	248.39
12-Mar-11 13:04:00	271.73	111.72	0.00	252.02	267.25
12-Mar-11 13:05:00	271.20	111.82	0.00	252.12	257.03
12-Mar-11 13:06:00	271.78	109.68	0.00	251.14	257.47
12-Mar-11 13:07:00	271.78	111.87	0.00	252.48	248.89
12-Mar-11 13:08:00	272.38	111.80	0.00	252.10	248.68
12-Mar-11 13:09:00	271.83	109.88	0.00	251.88	259.01
12-Mar-11 13:10:00	272.90	111.43	0.00	252.65	246.39
12-Mar-11 13:11:00	272.10	112.20	0.00	252.82	259.55
12-Mar-11 13:12:00	272.82	110.00	0.00	252.58	251.50
12-Mar-11 13:13:00	272.42	112.38	0.00	252.81	261.81
12-Mar-11 13:14:00	272.74	111.72	0.00	253.77	255.47
12-Mar-11 13:15:00	272.69	110.35	0.00	253.35	261.49
12-Mar-11 13:16:00	272.46	112.35	0.00	253.10	269.04
12-Mar-11 13:17:00	272.37	111.20	0.00	253.17	266.60
12-Mar-11 13:18:00	272.24	110.02	0.00	252.26	268.10
12-Mar-11 13:19:00	272.32	111.57	0.00	252.71	262.00
12-Mar-11 13:20:00	272.21	111.06	0.00	253.25	261.37
12-Mar-11 13:21:00	271.73	111.05	0.00	251.95	265.52
12-Mar-11 13:22:00	271.17	110.76	0.00	251.55	261.29
12-Mar-11 13:23:00	271.31	109.39	0.00	249.90	262.26
12-Mar-11 13:24:00	271.22	111.39	0.00	250.82	250.56
12-Mar-11 13:25:00	271.69	110.67	0.00	251.72	241.61
12-Mar-11 13:26:00	271.99	111.01	0.00	251.82	246.28
12-Mar-11 13:27:00	272.20	112.34	0.00	252.91	250.82
12-Mar-11 13:28:00	272.13	110.17	0.00	252.50	263.99
12-Mar-11 13:29:00	272.13	111.31	0.00	252.10	258.70
12-Mar-11 13:30:00	272.06	111.30	0.00	252.64	259.82
12-Mar-11 13:31:00	272.37	109.83	0.00	252.51	259.29
12-Mar-11 13:32:00	272.39	112.20	0.00	252.85	260.17
12-Mar-11 13:33:00	272.38	110.93	0.00	253.12	260.35
12-Mar-11 13:34:00	272.48	111.27	0.00	252.74	263.17
12-Mar-11 13:35:00	272.09	112.31	0.00	253.29	257.56
12-Mar-11 13:36:00	272.11	110.63	0.00	252.61	261.14
Average	272.20	111.07	0.00	252.56	258.98

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow KPPH	CT C Load MW	Ammonia Mass Flow CT C PPH
12-Mar-11 14:04:00	271.83	111.92	0.00	251.70	258.88
12-Mar-11 14:05:00	272.04	111.32	0.00	252.86	247.26
12-Mar-11 14:06:00	272.47	110.62	0.00	252.95	257.17
12-Mar-11 14:07:00	272.42	112.68	0.00	253.35	260.02
12-Mar-11 14:08:00	271.91	111.29	0.00	252.29	267.87
12-Mar-11 14:09:00	271.60	109.87	0.00	251.46	265.25
12-Mar-11 14:10:00	271.24	110.14	0.00	252.17	255.09
12-Mar-11 14:11:00	269.99	109.48	0.00	250.48	264.08
12-Mar-11 14:12:00	270.85	110.88	0.00	249.61	251.64
12-Mar-11 14:13:00	269.87	111.45	0.00	250.29	244.90
12-Mar-11 14:14:00	271.24	110.56	0.00	251.32	237.38
12-Mar-11 14:15:00	271.48	110.03	0.00	251.47	245.07
12-Mar-11 14:16:00	272.47	111.19	0.00	252.54	252.71
12-Mar-11 14:17:00	272.63	112.52	0.00	252.97	251.65
12-Mar-11 14:18:00	272.66	113.07	0.00	253.82	256.94
12-Mar-11 14:19:00	272.46	112.20	0.00	253.05	264.37
12-Mar-11 14:20:00	272.23	110.83	0.00	252.95	262.08
12-Mar-11 14:21:00	272.01	109.99	0.00	252.48	260.52
12-Mar-11 14:22:00	271.86	111.04	0.00	251.93	264.58
12-Mar-11 14:23:00	271.96	112.29	0.00	252.13	259.44
12-Mar-11 14:24:00	272.06	111.48	0.00	252.87	253.44
12-Mar-11 14:25:00	271.62	110.25	0.00	252.36	257.09
12-Mar-11 14:26:00	271.94	111.72	0.00	252.12	259.52
12-Mar-11 14:27:00	271.75	111.07	0.00	252.42	253.41
12-Mar-11 14:28:00	271.24	110.67	0.00	251.99	255.97
12-Mar-11 14:29:00	270.16	111.15	0.00	250.81	262.31
12-Mar-11 14:30:00	270.08	109.09	0.00	248.77	267.81
12-Mar-11 14:31:00	270.73	111.05	0.00	250.47	242.90
12-Mar-11 14:32:00	270.62	111.24	0.00	251.26	241.28
12-Mar-11 14:33:00	271.17	109.59	0.00	250.59	252.30
12-Mar-11 14:34:00	271.33	111.09	0.00	250.71	256.65
12-Mar-11 14:35:00	271.02	111.39	0.00	251.68	242.22
12-Mar-11 14:36:00	271.21	110.24	0.00	251.69	258.41
12-Mar-11 14:37:00	270.51	112.07	0.00	250.88	264.69
12-Mar-11 14:38:00	270.54	110.88	0.00	249.98	263.99
12-Mar-11 14:39:00	270.31	109.74	0.00	250.70	239.34
12-Mar-11 14:40:00	270.41	110.98	0.00	251.03	247.70
12-Mar-11 14:41:00	270.34	111.15	0.00	250.07	251.89
12-Mar-11 14:42:00	270.15	109.08	0.00	249.42	255.79
12-Mar-11 14:43:00	270.99	111.73	0.00	250.92	241.72
12-Mar-11 14:44:00	270.62	111.72	0.00	251.09	251.12
12-Mar-11 14:45:00	269.98	110.14	0.00	250.40	252.91
12-Mar-11 14:46:00	270.43	110.36	0.00	248.61	261.08
12-Mar-11 14:47:00	270.89	109.09	0.00	249.43	244.07
12-Mar-11 14:48:00	271.39	111.62	0.00	250.42	243.96
12-Mar-11 14:49:00	271.41	110.21	0.00	251.00	250.68
12-Mar-11 14:50:00	271.21	110.69	0.00	251.50	252.25
12-Mar-11 14:51:00	271.48	112.50	0.00	252.52	264.02
12-Mar-11 14:52:00	271.45	110.13	0.00	251.99	276.22
12-Mar-11 14:53:00	271.02	109.28	0.00	250.42	282.98
12-Mar-11 14:54:00	270.43	112.05	0.00	251.24	265.72
12-Mar-11 14:55:00	270.50	109.24	0.00	249.87	261.64
12-Mar-11 14:56:00	270.53	111.07	0.00	249.23	263.34
12-Mar-11 14:57:00	270.59	110.42	0.00	250.87	240.72
12-Mar-11 14:58:00	271.01	111.04	0.00	251.19	246.38
12-Mar-11 14:59:00	270.18	111.64	0.00	251.02	253.27
12-Mar-11 15:00:00	270.17	109.58	0.00	249.55	251.73
12-Mar-11 15:01:00	270.88	109.66	0.00	249.73	247.89
12-Mar-11 15:02:00	270.34	110.97	0.00	250.46	231.85
12-Mar-11 15:03:00	271.04	110.31	0.00	250.88	242.46
Average	271.15	110.85	0.00	251.23	254.66

UNIT OPERATION PARAMETERS

Base Load with Duct Burners

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow #/Hr	CT C Load MW	Ammonia Mass Flow CT C PPH
13-Mar-11 09:56:00	273.98	109.84	9515.00	254.10	280.04
13-Mar-11 09:57:00	274.58	113.48	9539.00	255.13	281.82
13-Mar-11 09:58:00	274.56	112.93	9551.00	256.13	273.09
13-Mar-11 09:59:00	273.66	111.48	9554.00	255.06	286.48
13-Mar-11 10:00:00	274.09	113.85	9558.00	254.98	288.46
13-Mar-11 10:01:00	273.30	110.66	9557.00	254.42	278.65
13-Mar-11 10:02:00	273.72	113.47	9567.00	254.80	274.62
13-Mar-11 10:03:00	274.19	112.35	9566.00	254.39	282.86
13-Mar-11 10:04:00	274.14	110.02	9567.00	254.55	267.10
13-Mar-11 10:05:00	274.56	113.96	9568.00	256.05	271.25
13-Mar-11 10:06:00	274.70	113.16	9574.00	256.61	280.06
13-Mar-11 10:07:00	273.91	112.61	9570.00	254.94	287.72
13-Mar-11 10:08:00	274.04	112.97	9572.00	254.10	287.50
13-Mar-11 10:09:00	274.32	111.10	9571.00	255.13	265.63
13-Mar-11 10:10:00	274.48	114.26	9570.00	255.55	267.10
13-Mar-11 10:11:00	274.45	113.78	9571.00	256.43	274.31
13-Mar-11 10:12:00	274.59	110.42	9567.00	255.32	282.52
13-Mar-11 10:13:00	274.56	113.54	9570.00	255.10	281.23
13-Mar-11 10:14:00	274.51	111.62	9571.00	256.21	270.22
13-Mar-11 10:15:00	274.48	113.20	9575.00	255.15	279.86
13-Mar-11 10:16:00	273.38	112.95	9576.00	255.22	274.42
13-Mar-11 10:17:00	272.85	111.44	9574.00	253.21	276.68
13-Mar-11 10:18:00	272.84	113.14	9571.00	252.68	280.50
13-Mar-11 10:19:00	273.70	110.48	9571.00	254.17	260.61
13-Mar-11 10:20:00	274.72	112.26	9566.00	254.77	265.90
13-Mar-11 10:21:00	274.61	113.11	9568.00	255.48	265.56
13-Mar-11 10:22:00	274.00	110.62	9560.00	255.07	274.33
13-Mar-11 10:23:00	274.43	114.38	9563.00	256.71	282.23
13-Mar-11 10:24:00	274.76	111.88	9563.00	255.18	294.39
13-Mar-11 10:25:00	274.64	110.60	9559.00	255.24	285.96
13-Mar-11 10:26:00	274.27	113.94	9559.00	256.12	281.20
13-Mar-11 10:27:00	274.66	111.03	9553.00	255.80	294.24
13-Mar-11 10:28:00	274.36	112.78	9559.00	254.95	295.04
13-Mar-11 10:29:00	273.96	112.75	9559.00	255.44	284.05
13-Mar-11 10:30:00	274.19	110.91	9553.00	254.41	289.43
13-Mar-11 10:31:00	274.36	113.71	9562.00	254.75	285.33
13-Mar-11 10:32:00	274.66	112.42	9571.00	255.85	278.71
13-Mar-11 10:33:00	274.37	112.63	9571.00	255.66	285.37
13-Mar-11 10:34:00	274.08	114.14	9571.00	255.39	288.49
13-Mar-11 10:35:00	274.02	110.49	9571.00	254.05	289.98
13-Mar-11 10:36:00	274.11	113.51	9571.00	255.38	279.38
13-Mar-11 10:37:00	273.95	110.68	9570.00	254.95	285.30
13-Mar-11 10:38:00	273.66	113.62	9570.00	254.30	289.85
13-Mar-11 10:39:00	273.44	110.78	9571.00	254.04	284.14
13-Mar-11 10:40:00	272.78	113.33	9569.00	253.10	286.49
13-Mar-11 10:41:00	273.58	111.31	9567.00	253.91	274.50
13-Mar-11 10:42:00	273.41	112.18	9567.00	254.22	273.42
13-Mar-11 10:43:00	273.22	114.09	9563.00	254.32	274.80
13-Mar-11 10:44:00	273.68	111.43	9567.00	254.03	276.18
13-Mar-11 10:45:00	273.53	110.58	9570.00	254.24	268.53
13-Mar-11 10:46:00	273.12	112.90	9565.00	253.55	274.71
13-Mar-11 10:47:00	273.38	109.86	9567.00	252.46	272.98
13-Mar-11 10:48:00	273.87	112.85	9568.00	253.46	262.75
13-Mar-11 10:49:00	273.48	112.08	9563.00	254.32	255.18
13-Mar-11 10:50:00	274.21	112.25	9565.00	254.74	260.89
13-Mar-11 10:51:00	274.36	114.35	9565.00	256.28	271.74
13-Mar-11 10:52:00	274.30	110.49	9560.00	254.84	276.52
13-Mar-11 10:53:00	274.46	113.34	9555.00	255.16	274.42
13-Mar-11 10:54:00	274.44	110.71	9556.00	255.56	271.86
13-Mar-11 10:55:00	274.22	114.08	9559.00	255.45	277.91
Average	274.05	112.31	9564.35	254.88	278.07

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow #/Hr	CT C Load MW	Ammonia Mass Flow CT C PPH
12-Mar-11 11:12:00	274.85	111.83	9552.00	255.74	273.08
12-Mar-11 11:13:00	275.21	111.18	9553.00	256.35	276.94
12-Mar-11 11:14:00	273.78	111.28	9550.00	256.22	282.26
12-Mar-11 11:15:00	273.74	111.94	9552.00	255.13	278.79
12-Mar-11 11:16:00	274.16	112.15	9548.00	253.90	262.17
12-Mar-11 11:17:00	274.01	112.84	9549.00	255.05	267.66
12-Mar-11 11:18:00	274.47	111.13	9550.00	255.72	276.77
12-Mar-11 11:19:00	274.45	111.94	9552.00	256.03	279.17
12-Mar-11 11:20:00	275.16	113.50	9549.00	256.82	277.64
12-Mar-11 11:21:00	275.04	112.95	9547.00	256.53	272.02
12-Mar-11 11:22:00	274.56	112.18	9549.00	257.07	276.34
13-Mar-11 11:23:00	273.70	113.64	9547.00	254.80	279.20
13-Mar-11 11:24:00	273.63	110.75	9550.00	254.40	278.06
13-Mar-11 11:25:00	273.60	113.26	9549.00	254.25	277.47
13-Mar-11 11:26:00	273.66	111.73	9547.00	254.41	273.95
13-Mar-11 11:27:00	273.83	111.47	9544.00	254.06	274.74
13-Mar-11 11:28:00	273.81	113.44	9543.00	254.90	269.89
13-Mar-11 11:29:00	273.77	110.56	9541.00	254.58	267.29
13-Mar-11 11:30:00	273.40	113.22	9544.00	254.06	277.56
13-Mar-11 11:31:00	273.26	112.14	9545.00	254.00	277.06
13-Mar-11 11:32:00	273.43	111.46	9544.00	253.68	273.59
13-Mar-11 11:33:00	273.68	113.21	9544.00	254.82	269.69
13-Mar-11 11:34:00	273.73	110.03	9540.00	254.22	273.15
13-Mar-11 11:35:00	273.68	113.41	9544.00	254.55	274.83
13-Mar-11 11:36:00	273.34	110.39	9546.00	254.23	271.10
13-Mar-11 11:37:00	273.16	111.71	9547.00	253.49	274.09
13-Mar-11 11:38:00	272.96	113.32	9542.00	253.68	277.97
13-Mar-11 11:39:00	273.43	110.22	9549.00	254.06	268.57
13-Mar-11 11:40:00	273.55	113.54	9549.00	254.58	270.92
13-Mar-11 11:41:00	273.26	112.03	9549.00	254.42	276.59
13-Mar-11 11:42:00	272.63	111.89	9549.00	253.26	276.56
13-Mar-11 11:43:00	272.85	112.56	9555.00	252.86	277.68
13-Mar-11 11:44:00	272.71	109.87	9550.00	252.86	276.06
13-Mar-11 11:45:00	272.45	112.10	9550.00	253.55	264.78
13-Mar-11 11:46:00	273.13	112.92	9552.00	254.09	276.05
13-Mar-11 11:47:00	272.57	109.80	9552.00	253.18	281.79
13-Mar-11 11:48:00	272.32	113.30	9551.00	252.81	281.28
13-Mar-11 11:49:00	272.79	111.25	9554.00	252.78	284.46
13-Mar-11 11:50:00	272.91	109.83	9549.00	253.05	269.10
13-Mar-11 11:51:00	272.99	112.87	9555.00	254.54	278.53
13-Mar-11 11:52:00	272.53	110.70	9552.00	253.18	288.69
13-Mar-11 11:53:00	272.66	111.12	9552.00	251.83	292.07
13-Mar-11 11:54:00	272.65	112.02	9555.00	253.57	273.53
13-Mar-11 11:55:00	272.64	110.79	9559.00	253.42	275.47
13-Mar-11 11:56:00	272.56	112.48	9563.00	252.77	283.40
13-Mar-11 11:57:00	272.57	109.90	9563.00	252.54	276.09
13-Mar-11 11:58:00	272.66	112.27	9563.00	253.07	275.80
13-Mar-11 11:59:00	272.49	110.17	9568.00	253.25	275.41
13-Mar-11 12:00:00	272.46	112.70	9568.00	252.38	283.07
13-Mar-11 12:01:00	272.33	111.29	9564.00	252.88	273.71
13-Mar-11 12:02:00	272.29	109.07	9568.00	252.42	276.53
13-Mar-11 12:03:00	271.59	112.71	9570.00	252.37	274.74
13-Mar-11 12:04:00	272.44	109.55	9563.00	252.31	271.85
13-Mar-11 12:05:00	272.00	113.06	9558.00	252.96	266.78
13-Mar-11 12:06:00	271.38	109.49	9561.00	251.75	271.65
13-Mar-11 12:07:00	272.13	111.94	9563.00	250.68	272.85
13-Mar-11 12:08:00	272.08	111.12	9563.00	252.14	252.80
13-Mar-11 12:09:00	272.24	108.87	9557.00	252.20	253.88
13-Mar-11 12:10:00	272.91	113.09	9555.00	253.39	264.27
13-Mar-11 12:11:00	272.71	111.33	9553.00	254.08	270.95
Average	273.18	111.71	9552.50	253.87	274.47

Unit 3 Emissions Testing

	Combustor Inlet Pressure C psig	CT C FG Flow KPPH	DB C FG Flow #/Hr	CT C Load MW	Ammonia Mass Flow CT C PPH
13-Mar-11 12:27:00	272.63	111.63	9549.00	253.64	285.45
13-Mar-11 12:28:00	272.14	111.22	9546.00	251.97	291.13
13-Mar-11 12:29:00	272.22	111.09	9547.00	252.40	281.00
13-Mar-11 12:30:00	272.47	110.99	9541.00	251.69	278.67
13-Mar-11 12:31:00	272.51	112.53	9536.00	253.17	277.32
13-Mar-11 12:32:00	272.31	109.76	9544.00	253.02	277.19
13-Mar-11 12:33:00	272.21	112.76	9545.00	252.45	285.81
13-Mar-11 12:34:00	272.37	109.48	9547.00	251.90	282.79
13-Mar-11 12:35:00	272.76	112.61	9547.00	252.40	273.98
13-Mar-11 12:36:00	272.90	112.36	9549.00	254.06	274.33
13-Mar-11 12:37:00	272.24	109.95	9549.00	252.75	278.91
13-Mar-11 12:38:00	271.50	112.70	9546.00	251.86	288.21
13-Mar-11 12:39:00	272.01	108.98	9546.00	250.91	278.38
13-Mar-11 12:40:00	272.36	112.12	9537.00	251.95	264.91
13-Mar-11 12:41:00	272.21	111.51	9540.00	253.33	275.15
13-Mar-11 12:42:00	272.15	111.05	9545.00	252.98	274.21
13-Mar-11 12:43:00	271.74	112.05	9542.00	252.02	285.02
13-Mar-11 12:44:00	270.76	109.02	9549.00	250.71	277.12
13-Mar-11 12:45:00	271.16	111.89	9543.00	250.84	268.52
13-Mar-11 12:46:00	271.40	109.42	9546.00	250.65	263.42
13-Mar-11 12:47:00	271.77	112.43	9545.00	251.83	254.44
13-Mar-11 12:48:00	272.02	109.67	9544.00	252.42	257.91
13-Mar-11 12:49:00	271.97	112.95	9543.00	252.84	264.08
13-Mar-11 12:50:00	272.04	110.23	9541.00	251.94	272.71
13-Mar-11 12:51:00	271.94	112.23	9542.00	252.54	261.93
13-Mar-11 12:52:00	271.38	110.02	9542.00	252.08	268.41
13-Mar-11 12:53:00	270.46	111.01	9547.00	250.28	274.77
13-Mar-11 12:54:00	270.77	110.91	9550.00	250.04	265.24
13-Mar-11 12:55:00	271.07	109.36	9552.00	251.01	253.78
13-Mar-11 12:56:00	271.31	111.61	9549.00	251.57	259.74
13-Mar-11 12:57:00	271.51	111.48	9547.00	250.75	259.05
13-Mar-11 12:58:00	272.26	110.46	9545.00	252.44	249.30
13-Mar-11 12:59:00	272.20	112.05	9544.00	252.56	262.90
13-Mar-11 13:00:00	272.30	111.52	9542.00	253.75	268.67
13-Mar-11 13:01:00	272.05	112.47	9544.00	251.46	280.26
13-Mar-11 13:02:00	271.84	109.62	9542.00	251.76	274.12
13-Mar-11 13:03:00	271.31	112.38	9547.00	252.42	265.10
13-Mar-11 13:04:00	271.56	109.07	9552.00	250.84	273.50
13-Mar-11 13:05:00	271.69	111.37	9550.00	250.86	281.94
13-Mar-11 13:06:00	271.87	109.13	9552.00	251.63	266.43
13-Mar-11 13:07:00	271.66	112.23	9550.00	252.41	269.39
13-Mar-11 13:08:00	272.26	111.24	9552.00	252.51	281.64
13-Mar-11 13:09:00	272.03	111.10	9552.00	252.09	286.61
13-Mar-11 13:10:00	271.85	111.17	9555.00	251.93	279.56
13-Mar-11 13:11:00	271.58	111.00	9552.00	252.65	277.38
13-Mar-11 13:12:00	271.57	110.52	9550.00	250.56	287.21
13-Mar-11 13:13:00	270.86	110.57	9550.00	251.59	271.36
13-Mar-11 13:14:00	270.90	110.87	9552.00	250.50	274.87
13-Mar-11 13:15:00	270.77	109.93	9549.00	250.43	272.59
13-Mar-11 13:16:00	271.58	111.59	9546.00	250.81	259.95
13-Mar-11 13:17:00	272.02	109.59	9541.00	252.26	260.76
13-Mar-11 13:18:00	271.89	112.65	9543.00	252.46	268.81
13-Mar-11 13:19:00	271.44	110.76	9547.00	251.41	269.94
13-Mar-11 13:20:00	271.52	111.44	9543.00	250.77	279.18
13-Mar-11 13:21:00	271.88	109.28	9547.00	251.37	259.74
13-Mar-11 13:22:00	271.87	112.20	9547.00	252.49	263.99
13-Mar-11 13:23:00	271.77	112.09	9549.00	252.73	269.72
13-Mar-11 13:24:00	271.27	109.25	9545.00	250.94	280.23
13-Mar-11 13:25:00	270.87	111.65	9545.00	249.94	285.75
13-Mar-11 13:26:00	271.12	109.61	9545.00	250.95	272.42
Average	271.77	111.03	9546.23	251.84	272.45

APPENDIX C

CALIBRATION GAS CERTIFICATIONS

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-55510
Project No.: 05-86523-002

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
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=0.9999996852

Constants:	A=-0.0380151
B=1.001181066	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=-0.00585731
B=0.131065562 C=-0.0001375
D=1.12705E-06 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 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
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 11010210
Document # : 40522095-002

Customer
AIR HYGIENE INTERNATIONAL

MIKE SCOTT
5634 S 122ND E AVE
TULSA OK 74146
US

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: AAL191 **Certification Date:** 15Feb2011 **Exp. Date:** 16Aug2011
Cylinder Pressure*:** 1950 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
NITRIC OXIDE	4.89	PPM	+/- 1%	Direct NIST and VSL
CARBON MONOXIDE	4.92	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	4.93	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	15Aug2013	KAL003004	19.83	PPM	NITRIC OXIDE
NTRM 2635	05May2016	KAL003163	25.21	PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
ECO PHYSICS/CLD 84M/84M0359	07Feb2011	CHEMI
SIEMENS I/ULTRAMAT 6E/N1-VN-0545	25Jan2011	NDIR

ANALYZER READINGS

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

First Triad Analysis	Second Triad Analysis	Calibration Curve
NITRIC OXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=19.83000 T1=4.85900	Z1=0.00000 R1=19.72000 T1=4.83700	r=0.9999
R2=19.84000 Z2=0.00000 T2=4.86000	R2=19.73000 Z2=0.00000 T2=4.83400	Constants: A=0.036017895
Z3=0.00000 T3=4.85700 R3=19.84000	Z3=0.00000 T3=4.83100 R3=19.73000	B=0.999152579 C=0
Avg. Concentration: 4.889 PPM	Avg. Concentration: 4.891 PPM	D=0 E=0
CARBON MONOXIDE		
Date: 08Feb2011 Response Unit: MV	Date: 15Feb2011 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=25.40000 T1=4.60000	Z1=0.00000 R1=25.21000 T1=4.61000	r=0.9999
R2=25.40000 Z2=0.00000 T2=4.60000	R2=25.21000 Z2=0.00000 T2=4.61000	Constants: A=0.02020944
Z3=0.00000 T3=4.60000 R3=25.40000	Z3=0.00000 T3=4.61000 R3=25.21000	B=1.096985091 C=-0.0077427
Avg. Concentration: 4.898 PPM	Avg. Concentration: 4.944 PPM	D=0.000148781 E=0

Special Notes: AH070

APPROVED BY: HILARY THATCHER

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: 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
	02Oct2010	KAL003166	25.21 PPM	CARBON MONOXIDE
NTRM 2629	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	Second Triad Analysis	Calibration Curve
CARBON MONOXIDE		
Date: 14Apr2010 Response Unit:PPM	Date: 21Apr2010 Response Unit: PPM	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=-0.05307 R1=25.30663 T1=12.10338	Z1=-0.06291 R1=25.26965 T1=12.17129	r=9.99986E-1
R2=25.31267 Z2=-0.05306 T2=12.12388	R2=25.30621 Z2=-0.02751 T2=12.19590	Constants: A=0.00000E+0
Z3=-0.03830 T3=12.14423 R3=25.34334	Z3=0.02191 T3=12.19939 R3=25.34779	B=8.81389E-1 C=5.84000E-4
Avg. Concentration: 12.09 PPM	Avg. Concentration: 12.15 PPM	D=1.00000E-6 E=0.00000E+0
NITRIC OXIDE		
Date: 14Apr2010 Response Unit:MV	Date: 21Apr2010 Response Unit: MV	Concentration=A+Bx+Cx2+Dx3+Ex4
Z1=0.00000 R1=20.33000 T1=12.05000	Z1=0.00000 R1=20.29000 T1=11.96000	r=0.999989
R2=20.35000 Z2=0.00000 T2=12.05000	R2=20.28000 Z2=0.00000 T2=11.96000	Constants: A=0.052499
Z3=0.00000 T3=12.05000 R3=20.34000	Z3=0.00000 T3=11.96000 R3=20.29000	B=0.998591 C=0.000000
Avg. Concentration: 12.11 PPM	*Avg. Concentration:* 12.04 PPM	D=0.000000 E=0.000000

Special Notes: AH072 Lot Number: 0586916005

APPROVED BY: Rob McCrandall

AIR LIQUIDE™

CERTIFICATION OF ANALYSIS

Interference Free Multi-Component EPA Protocol Gases

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

Cylinder S/N: CC103445

Customer: AIR HYGIENE
Location: TULSA, OK

P.O. Number: 9041201
Item Number: SGZCAH001

Shipping Order Number: 33223677
Transfer Number: 33223677
Lot Number: SFS131505
Valve: CGA 350
Cylinder Pressure*: 2000 PSIG
*Cylinder should not be used when gas pressure is below 150 psig

Assay Date: 30-Apr-2009
Expiration Date: 30-Apr-2012

Components	Requested Concentration	Assay Concentration
Nitrogen	**Balance**	**Balance**
Methane	**3 ppm**	**2.89 ± 0.03 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 · 30-Apr-2009*				
Analyzer Information			Trial 1	Trial 2	Trial 3	Units	
Analyzer Type:	Gas Chromatograph	Zero	0.000	0.000	0.000	Area	
Manufacturer:	Hewlett Packard	Reference	97.31	97.29	97.20	Area	
Model Number:	G1540A	Candidate	27.99	27.97	27.96	Area	
Serial Number:	US00003390/Meth	Result	2.894	2.892	2.894	ppm	
MPR Last Calibrated:	23-Apr-2009	Evaluation	Valid	Valid	Valid		
Analytical Principle:	FID & TCD				Mean Analytical Result:	2.893	ppm

Analyst: Eric Barron

Approved by: Thuan Tran

AIR LIQUIDE AMERICA, L.P. Region Office • 8832 Dice Road, Santa Fe Springs, CA 90670-2516
Phone: (562) 945-1383 • Fax: (562) 693-1156

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

P.O. Number: 9032901
Item Number: SGZCAH002

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

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	SFS103676	18-Mar-2010	NI	GMIS

Analytical Data

Component:	Methane		FIRST TRIAD ANALYSIS 24-Apr-2009				
Analyzer Information			Trial 1	Trial 2	Trial 3	Units	
Analyzer Type:	Gas Chromatograph	Zero	0.000	0.000	0.000	Area	
Manufacturer:	Hewlett Packard	Reference	97.22	97.24	97.24	Area	
Model Number:	G1540A	Candidate	45.95	45.92	46.03	Area	
Serial Number:	US00003390/Meth	Result	4.755	4.751	4.762	ppm	
MPR Last Calibrated:	23-Apr-2009	Evaluation	Valid	Valid	Valid		
Analytical Principle:	FID & TCD				Mean Analytical Result:	4.756	ppm

Analyst: Eric Barron

Approved by: Jason Unger

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.: 9081310
AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 05-79607-014
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: 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+Cx2+Dx3+Ex4	
r=0.999995113	
Constants:	A=0.11264489
B=0.000109556	C=0
D=0	E=0

APPROVED BY:
ROBERT LESNIAK

AIR LIQUIDE

Air Liquide America
Specialty Gases LLC

Scott™

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

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
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

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

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
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. NO_2 to NO conversion was checked via direct connect with an EPA Protocol certified concentration of NO_2 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:	March 12-13, 2011
Company:	Florida Power and Light
Location:	Loxahatchee, Florida
Techs:	JF/TG/RW/AS

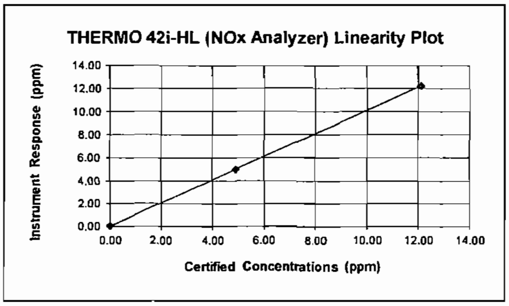
Sample System Leak Check

Date	Sample System	Leak Rate (l/min)
March 12-13, 2011	1	0

Calibration Date: March 12, 2011
Client: Florida Power and Light

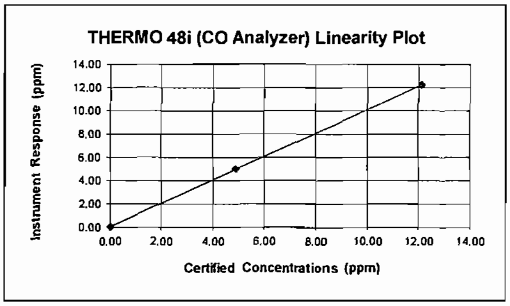
NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.05	0.41	0.05	YES (%)
4.93	5.03	0.83	0.10	YES (%)
12.10	12.22	0.99	0.12	YES (%)
Linearity = 0.994				


THERMO 42i-HL (NOx Analyzer) Linearity Plot

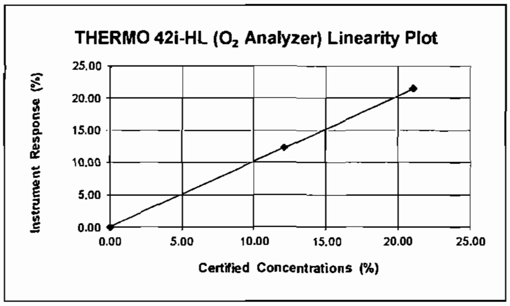
CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.04	0.33	0.04	YES (%)
4.92	5.01	0.74	0.09	YES (%)
12.10	12.21	0.91	0.11	YES (%)
Linearity = 0.994				


THERMO 48i (CO Analyzer) Linearity Plot

O_2 Span (%) = 21.10

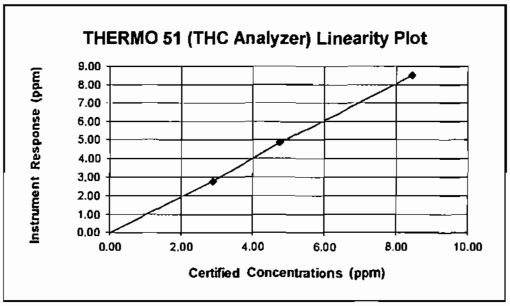
THERMO 42i-HL (O_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.05	0.24	0.05	YES (%)
12.10	12.29	0.90	0.19	YES (%)
21.10	21.51	1.94	0.41	YES (%)
Linearity = 0.984				


THERMO 42i-HL (O_2 Analyzer) Linearity Plot

THC Range (ppm) = 10

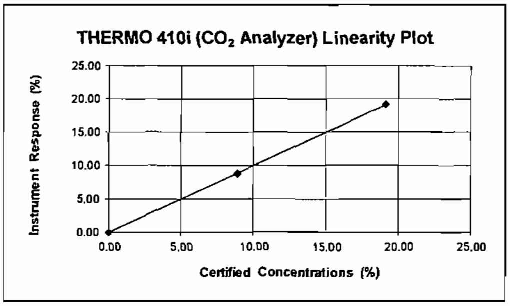
THERMO 51 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2,5%)[1]
0.00	-0.01	-0.10	N/A	YES
2.89	2.77	-4.63	2.90	YES
4.76	4.87	1.69	4.79	YES
8.46	8.52	0.60	N/A	YES
Linearity = 0.974				

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


THERMO 51 (THC Analyzer) Linearity Plot

CO_2 Span (%) = 19.10

THERMO 410i (CO_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.04	0.21	0.04	YES (%)
8.91	8.87	-0.21	0.04	YES (%)
19.10	19.17	0.37	0.07	YES (%)
Linearity = 0.998				


THERMO 410i (CO_2 Analyzer) Linearity Plot

NOx Converter Efficiency

Date: March 12, 2011
Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**1.76**
	Analyzer Reading, NOx Channel, ppmvd	**48.48**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**46.72**
	Converter Efficiency, %	**96.93**

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.

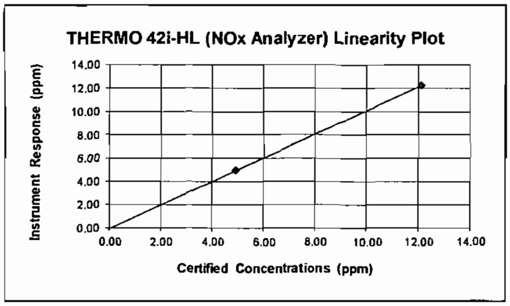
$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V}\right) \times 100 \qquad \text{Eq. 7E-7} = \frac{46.72\ \text{ppmvd}}{48.20\ \text{ppmvd}} \times 100 = 96.93\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/12/11 08:10:37	1650	47.43	1.93
03/12/11 08:11:07	1680	47.47	1.89
03/12/11 08:11:37	1710	47.65	1.87
03/12/11 08:12:07	1740	47.80	1.84
03/12/11 08:12:37	1770	47.89	1.82
03/12/11 08:13:07	1800	48.00	1.81
03/12/11 08:13:37	1830	48.12	1.79
03/12/11 08:14:07	1860	48.17	1.77
03/12/11 08:14:37	1890	48.23	1.77
03/12/11 08:15:07	***1920***	***48.48***	***1.76***
03/12/11 08:15:37	1950	30.60	1.39

Calibration Date: March 13, 2011
Client: Florida Power and Light

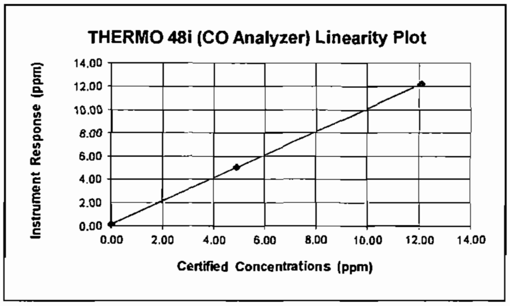
NOx Span (ppm) = 12.10

THERMO 42i-HL (NOx Analyzer)				
Certified Concentration (ppm)	*Instrument Response (ppm)*	*Calibration Error (%)*	*Absolute Conc. (ppm)*	*Pass or Fail (±2%, ≤0.5ppm)*
0.00	-0.05	-0.41	0.05	YES (%)
4.93	4.99	0.50	0.06	YES (%)
12.10	12.22	0.99	0.12	YES (%)
Linearity = 0.987				



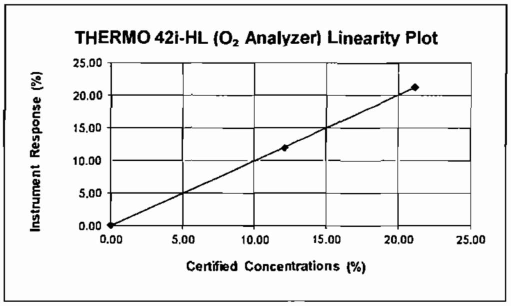
CO Span (ppm) = 12.10

THERMO 48i (CO Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Absolute Conc. (ppm)	Pass or Fail (±2%, ≤0.5ppm)
0.00	0.16	1.32	0.16	YES (%)
4.92	5.08	1.32	0.16	YES (%)
12.10	12.20	0.83	0.10	YES (%)
Linearity = 1.005				



O2 Span (%) = 21.10

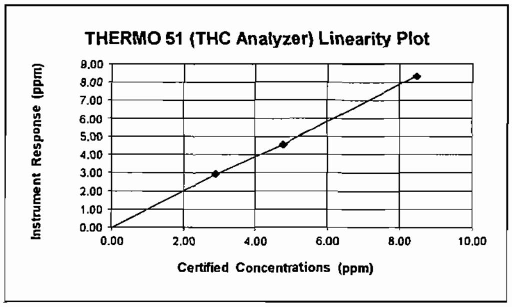
THERMO 42i-HL (O_2 Analyzer)				
Certified Concentration (%)	Instrument Response (%)	Calibration Error (%)	Absolute Conc. (%)	Pass or Fail (±2%, ≤0.5%)
0.00	0.10	0.47	0.10	YES (%)
12.10	12.04	-0.28	0.06	YES (%)
21.10	21.26	0.76	0.16	YES (%)
Linearity = 0.998				



THC Range (ppm) = 10

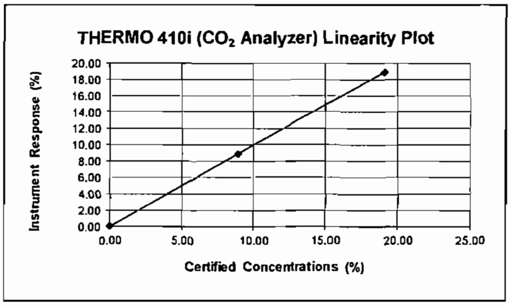
THERMO 51 (THC Analyzer)				
Certified Concentration (ppm)	Instrument Response (ppm)	Calibration Error (%)	Estimated Point (ppm)	Pass or Fail (±2,5%)[1]
0.00	-0.01	-0.10	N/A	YES
2.89	2.93	3.15	2.84	YES
4.76	4.56	-2.57	4.68	YES
8.46	8.33	-1.30	N/A	YES
Linearity = 1.023				

[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	0.06	0.31	0.06	YES (%)
8.91	8.92	0.05	0.01	YES (%)
19.10	18.88	-1.15	0.22	YES (%)
Linearity = 1.015				



NOx Converter Efficiency

Date: March 13, 2011
Analyzer: INST-N2-0001

RM 7E, (12-17-09), Sections 7.1.4; 8.2.4.1; 12.7; and 13.5 Introduce NO_2 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 NO_2 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	**1.81**
	Analyzer Reading, NOx Channel, ppmvd	**48.70**
	Analyzer Reading, NO_2 Channel ($C_{Dir(NO2)}$), ppmvd	**46.89**
	Converter Efficiency, %	**97.28**

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.

$$Eff_{NO2} = \left(\frac{C_{Dir}}{C_V}\right) \times 100 \quad \text{Eq. 7E-7} = \frac{46.89 \text{ ppmvd}}{48.20 \text{ ppmvd}} \times 100 = 97.28\%$$

Date/Time mm/dd/yy hh:mm:ss	Elapsed Time Seconds	NOx ppmvd	NO ppmvd
03/13/11 06:58:01	1200	36.93	2.46
03/13/11 06:58:31	1230	45.61	2.01
03/13/11 06:59:01	1260	47.04	1.95
03/13/11 06:59:31	1290	47.70	1.91
03/13/11 07:00:01	1320	48.14	1.86
03/13/11 07:00:31	1350	48.48	1.83
03/13/11 07:01:01	***1380***	***48.70***	***1.81***
03/13/11 07:01:31	1410	37.23	1.72

DRIFT AND BIAS CHECK

	Strat Test Pre and Post QA/QC Check	O2	CO	NOx
	Initial Zero	0.01	0.08	-0.10
	Final Zero	0.15	0.07	-0.25
	Avg. Zero	0.08	0.08	-0.18
	Initial UpScale	12.11	4.84	4.99
	Final UpScale	12.28	4.79	4.87
	Avg. UpScale	12.20	4.82	4.93
	Sys Resp (Zero)	0.05	0.04	0.05
	Sys Resp (Upscale)	12.29	5.01	5.03
	Upscale Cal Gas	12.10	14.89	12.10
	Initial Zero Bias	-0.19%	0.33%	-1.24%
	Final Zero Bias	0.47%	0.25%	-2.48%
	Zero Drift	0.66%	0.08%	1.24%
	Initial Upscale Bias	-0.85%	-1.40%	-0.33%
	Final Upscale Bias	-0.05%	-1.82%	-1.32%
	Upscale Drift	0.81%	0.41%	0.99%
Alternative Specification Abs Diff	**Initial Zero**	0.04	0.04	0.15
	Final Zero	0.10	0.03	0.30
	Initial Upscale	0.18	0.17	0.04
	Final Upscale	0.01	0.22	0.16
	Calibration Span	21.10	12.10	12.10
	3% of Range (drift)	0.63	0.36	0.36
	5% of Range (bias)	1.06	0.61	0.61

Respone Time (min)	0.7	1.3	1.3
Sys. Response (min)		1.3	

Date/Time mm/dd/yy hh:mm:ss	z	O2 %	s	z	CO ppm	s	z	NOx ppm	s	INJECTIONS
03/12/11 09:10:07		13.05			0.57			3.17		x
03/12/11 09:10:17		13.04			0.55			3.16		
03/12/11 09:10:27		**11.98**			0.60			3.18		
03/12/11 09:10:37		8.13			0.58			3.17		
03/12/11 09:10:47		**11.91**	x		0.45			3.12		
03/12/11 09:10:57		**12.07**		x	**0.16**			2.84		
03/12/11 09:11:07		**12.09**			**0.07**			1.35		
03/12/11 09:11:17		**12.10**			**0.01**		x	**0.05**		
03/12/11 09:11:27		**12.11**			**0.01**			**-0.11**		
03/12/11 09:11:37		**12.09**			**-0.03**			**-0.23**		
03/12/11 09:11:47		**12.10**			**0.02**			**-0.25**		
03/12/11 09:11:57		**12.10**			**-0.01**			**-0.26**		
03/12/11 09:12:07		**12.11**			**-0.02**			**-0.26**		
03/12/11 09:12:17		**12.08**			**-0.09**			**-0.25**		
03/12/11 09:12:27		**12.10**			**-0.01**			**-0.28**		
03/12/11 09:12:37		**12.10**			**0.16**			**-0.27**		
03/12/11 09:12:47		**12.11**			**0.07**			**-0.27**		
03/12/11 09:12:57		**12.09**			**0.08**			**-0.27**		x
03/12/11 09:13:07		**12.10**			**0.05**			**-0.26**		
03/12/11 09:13:17		**11.63**			**0.07**			**-0.29**		
03/12/11 09:13:27		2.16			**0.24**			**-0.29**		
03/12/11 09:13:37	x	**0.07**			1.19			**0.10**		
03/12/11 09:13:47		**0.01**			2.61			2.12		
03/12/11 09:13:57		**-0.02**			3.79			3.76		
03/12/11 09:14:07		**-0.02**			4.46			4.30		
03/12/11 09:14:17		**-0.03**			**4.69**	x		**4.83**	x	
03/12/11 09:14:27		**-0.03**			**4.79**			**4.86**		
03/12/11 09:14:37		**-0.03**			**4.80**			**4.89**		
03/12/11 09:14:47		**-0.03**			**4.80**			**4.90**		
03/12/11 09:14:57		**-0.05**			**4.83**			**4.92**		
03/12/11 09:15:07		**-0.04**			**4.74**			**4.92**		

DRIFT AND BIAS CHECK

Base Load, Run - 1		O_2	NOx	CO	VOC	CO_2
	Raw Average	13.08	2.29	0.60	0.05	4.36
	Corrected Average	13.12	2.22	0.63	0.07	4.24
	Initial Zero	-0.02	-0.02	0.07	-0.01	0.14
	Final Zero	-0.01	0.02	-0.10	-0.01	0.24
	Avg. Zero	-0.02	0.00	-0.02	-0.01	0.19
	Initial UpScale	12.06	5.10	4.79	2.96	8.87
	Final UpScale	12.06	5.10	4.80	2.77	9.02
	Avg. UpScale	12.06	5.10	4.80	2.87	8.95
	Sys Resp (Zero)	0.05	0.05	0.04	-0.01	0.04
	Sys Resp (Upscale)	12.29	5.03	5.01	2.77	8.87
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	-0.33%	-0.58%	0.25%	0.00%	0.52%
	Final Zero Bias	-0.28%	-0.25%	-1.16%	0.00%	1.05%
	Zero Drift	0.05%	0.33%	1.40%	0.00%	0.52%
	Initial Upscale Bias	-1.09%	0.58%	-1.82%	1.90%	0.00%
	Final Upscale Bias	-1.09%	0.58%	-1.74%	0.00%	0.79%
	Upscale Drift	0.00%	0.00%	0.08%	1.90%	0.79%
Alternative Specification Abs Diff	Initial Zero	0.07	0.07	0.03	--	0.10
	Final Zero	0.06	0.03	0.14	--	0.20
	Initial Upscale	0.23	0.07	0.22	--	0.00
	Final Upscale	0.23	0.07	0.21	--	0.15
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

DRIFT AND BIAS CHECK

Base Load, Run - 2		O_2	NOx	CO	VOC	CO_2
	Raw Average	13.06	2.43	0.50	0.00	4.48
	Corrected Average	13.11	2.35	0.61	0.01	4.22
	Initial Zero	-0.01	0.02	-0.10	-0.01	0.24
	Final Zero	-0.05	-0.04	-0.10	0.00	0.38
	Avg. Zero	-0.03	-0.01	-0.10	-0.01	0.31
	Initial UpScale	12.06	5.10	4.80	2.77	9.02
	Final UpScale	12.06	5.11	4.73	2.87	9.20
	Avg. UpScale	12.06	5.11	4.77	2.82	9.11
	Sys Resp (Zero)	0.05	0.05	0.04	-0.01	0.04
	Sys Resp (Upscale)	12.29	5.03	5.01	2.77	8.87
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	-0.28%	-0.25%	-1.16%	0.00%	1.05%
	Final Zero Bias	-0.47%	-0.74%	-1.16%	0.10%	1.78%
	Zero Drift	0.19%	0.50%	0.00%	0.10%	0.73%
	Initial Upscale Bias	-1.09%	0.58%	-1.74%	0.00%	0.79%
	Final Upscale Bias	-1.09%	0.66%	-2.31%	1.00%	1.73%
	Upscale Drift	0.00%	0.08%	0.58%	1.00%	0.94%
Alternative Specification Abs Diff	Initial Zero	0.06	0.03	0.14	--	0.20
	Final Zero	0.10	0.09	0.14	--	0.34
	Initial Upscale	0.23	0.07	0.21	--	0.15
	Final Upscale	0.23	0.08	0.28	--	0.33
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

DRIFT AND BIAS CHECK

Base Load, Run - 3		O_2	NOx	CO	VOC	CO_2
	Raw Average	13.03	2.34	0.49	0.09	4.62
	Corrected Average	13.05	2.28	0.63	0.09	4.22
	Initial Zero	-0.05	-0.04	-0.10	0.00	0.38
	Final Zero	0.02	-0.03	-0.17	0.00	0.50
	Avg. Zero	-0.02	-0.04	-0.14	0.00	0.44
	Initial UpScale	12.06	5.11	4.73	2.87	9.20
	Final UpScale	12.09	5.10	4.76	3.14	9.36
	Avg. UpScale	12.08	5.11	4.75	3.01	9.28
	Sys Resp (Zero)	0.05	0.05	0.04	-0.01	0.04
	Sys Resp (Upscale)	12.29	5.03	5.01	2.77	8.87
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	-0.47%	-0.74%	-1.16%	0.10%	1.78%
	Final Zero Bias	-0.14%	-0.66%	-1.74%	0.10%	2.41%
	Zero Drift	0.33%	0.08%	0.58%	0.00%	0.63%
	Initial Upscale Bias	-1.09%	0.66%	-2.31%	1.00%	1.73%
	Final Upscale Bias	-0.95%	0.58%	-2.07%	3.70%	2.57%
	Upscale Drift	0.14%	0.08%	0.25%	2.70%	0.84%
Alternative Specification Abs Diff	*Initial* Zero	0.10	0.09	0.14	--	0.34
	Final Zero	0.03	0.08	0.21	--	0.46
	Initial Upscale	0.23	0.08	0.28	--	0.33
	Final Upscale	0.20	0.07	0.25	--	0.49
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

DRIFT AND BIAS CHECK

Base W/Db Load, Run - 4		O_2	NOx	CO	VOC	CO_2
	Raw Average	12.45	2.22	1.09	0.65	4.77
	Corrected Average	12.41	2.26	1.09	0.60	4.75
	Initial Zero	0.00	-0.01	0.03	0.26	0.06
	Final Zero	0.09	-0.14	-0.11	0.12	0.12
	Avg. Zero	0.05	-0.08	-0.04	0.19	0.09
	Initial UpScale	12.11	4.99	5.07	2.76	8.92
	Final UpScale	12.17	4.87	5.06	2.69	8.82
	Avg. UpScale	12.14	4.93	5.07	2.73	8.87
	Sys Resp (Zero)	0.10	-0.05	0.16	-0.01	0.06
	Sys Resp (Upscale)	12.04	4.99	5.08	2.93	8.92
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	-0.47%	0.33%	-1.07%	2.70%	0.00%
	Final Zero Bias	-0.05%	-0.74%	-2.23%	1.30%	0.31%
	Zero Drift	0.43%	1.07%	1.16%	1.40%	0.31%
	Initial Upscale Bias	0.33%	0.00%	-0.08%	-1.70%	0.00%
	Final Upscale Bias	0.62%	-0.99%	-0.17%	-2.40%	-0.52%
	Upscale Drift	0.28%	0.99%	0.08%	0.70%	0.52%
Alternative Specification Abs Diff	Initial Zero	0.10	0.04	0.13	--	0.00
	Final Zero	0.01	0.09	0.27	--	0.06
	Initial Upscale	0.07	0.00	0.01	--	0.00
	Final Upscale	0.13	0.12	0.02	--	0.10
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

DRIFT AND BIAS CHECK

Base W/Db Load, Run - 5		O_2	NOx	CO	VOC	CO_2
	Raw Average	12.50	2.22	0.93	0.41	4.81
	Corrected Average	12.42	2.32	1.00	0.23	4.77
	Initial Zero	0.09	-0.14	-0.11	0.12	0.12
	Final Zero	0.11	-0.10	-0.16	0.39	0.12
	Avg. Zero	0.10	-0.12	-0.14	0.26	0.12
	Initial UpScale	12.17	4.87	5.06	2.69	8.82
	Final UpScale	12.19	4.86	5.09	2.73	8.94
	Avg. UpScale	12.18	4.87	5.08	2.71	8.88
	Sys Resp (Zero)	0.10	-0.05	0.16	-0.01	0.06
	Sys Resp (Upscale)	12.04	4.99	5.08	2.93	8.92
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	-0.05%	-0.74%	-2.23%	1.30%	0.31%
	Final Zero Bias	0.05%	-0.41%	-2.64%	4.00%	0.31%
	Zero Drift	0.09%	0.33%	0.41%	2.70%	0.00%
	Initial Upscale Bias	0.62%	-0.99%	-0.17%	-2.40%	-0.52%
	Final Upscale Bias	0.71%	-1.07%	0.08%	-2.00%	0.10%
	Upscale Drift	0.09%	0.08%	0.25%	0.40%	0.63%
Alternative Specification Abs Diff	Initial Zero	0.01	0.09	0.27	--	0.06
	Final Zero	0.01	0.05	0.32	--	0.06
	Initial Upscale	0.13	0.12	0.02	--	0.10
	Final Upscale	0.15	0.13	0.01	--	0.02
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

DRIFT AND BIAS CHECK

Base W/Db Load, Run - 6		O_2	NOx	CO	VOC	CO_2
	Raw Average	12.54	2.51	0.85	0.27	4.85
	Corrected Average	12.45	2.60	0.96	-0.03	4.76
	Initial Zero	0.11	-0.10	-0.16	0.39	0.12
	Final Zero	0.11	-0.14	-0.19	0.26	0.16
	Avg. Zero	0.11	-0.12	-0.18	0.33	0.14
	Initial UpScale	12.19	4.86	5.09	2.73	8.94
	Final UpScale	12.19	4.87	5.07	2.65	8.99
	Avg. UpScale	12.19	4.87	5.08	2.69	8.97
	Sys Resp (Zero)	0.10	-0.05	0.16	-0.01	0.06
	Sys Resp (Upscale)	12.04	4.99	5.08	2.93	8.92
	Upscale Cal Gas	12.10	4.93	4.92	2.89	8.91
	Initial Zero Bias	0.05%	-0.41%	-2.64%	4.00%	0.31%
	Final Zero Bias	0.05%	-0.74%	-2.89%	2.70%	0.52%
	Zero Drift	0.00%	0.33%	0.25%	1.30%	0.21%
	Initial Upscale Bias	0.71%	-1.07%	0.08%	-2.00%	0.10%
	Final Upscale Bias	0.71%	-0.99%	-0.08%	-2.80%	0.37%
	Upscale Drift	0.00%	0.08%	0.17%	0.80%	0.26%
Alternative Specification Abs Diff	Initial Zero	0.01	0.05	0.32	--	0.06
	Final Zero	0.01	0.09	0.35	--	0.10
	Initial Upscale	0.15	0.13	0.01	--	0.02
	Final Upscale	0.15	0.12	0.01	--	0.07
	Calibration Span	21.10	12.10	12.10	10.00	19.10
	3% of Cal. Span (drift)	0.63	0.36	0.36	0.30	0.57
	5% of Cal. Span (bias)	1.06	0.61	0.61	0.50	0.96

NOZZLE CALIBRATION SHEET

NOZZLE SET IDENTIFICATION: SAMP-NS-000I
CALIBRATION DATE: April 22, 2010
CALIPER NUMBER: SAMP-DC-0011
NAME OF CALIBRATOR: Jake Fahlenkamp

NOZZLE I.D.	DIAMETER	AVERAGE DIAMETER	EPA Method 5, Sec. 10.1 Criteria
I#4	0.109	0.108	PASS
	0.108		
	0.106		
I#6	0.174	0.175	PASS
	0.176		
	0.175		
I8	0.234	0.232	PASS
	0.231		
	0.232		
I#10	0.311	0.309	PASS
	0.309		
	0.308		
I#12	0.357	0.357	PASS
	0.357		
	0.356		
I#14	0.433	0.434	PASS
	0.436		
	0.434		
I#16	0.488	0.489	PASS
	0.491		
	0.489		

METERING SYSTEM DRY GAS METER CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: *samp-cp-0010*

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)
Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693

Date: 03/04/11
Barometric Pressure: 29.85 (in. Hg)
Theoretical Critical Vacuum: 14.08 (in. Hg)

DRY GAS METER READINGS

ΔH	Time	Volume			Initial Temperature	
(in. H2O)	(min)	Initial (ft^3)	Final (ft^3)	Total (ft^3)	Inlet (°F)	Outlet (°F)
0.78	17.00	91.440	100.260	8.820	84.0	79.0
1.10	12.00	100.260	107.390	7.130	77.0	77.0
1.40	10.00	107.390	114.280	6.890	75.0	75.0
2.30	10.00	114.280	123.040	8.760	75.0	75.0
3.50	10.00	123.040	133.620	10.580	75.0	74.0

Final Temperature		Orifice	K' Orifice	Actual	Ambient Temperature		
Inlet (°F)	Outlet (°F)	Serial# (number)	Coefficient (see above)	Vacuum (in. Hg)	Initial (°F)	Final (°F)	Average (°F)
77.0	77.0	15	0.3865	16.0	69.6	70.0	69.8
75.0	75.0	17	0.4454	16.0	70.0	70.0	70.0
75.0	75.0	19	0.5196	16.0	70.0	70.2	70.1
75.0	74.0	25	0.6642	15.5	70.2	70.2	70.2
77.0	74.0	30	0.8090	14.5	70.0	69.8	69.9

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)
8.629	244.37	8.521	241.3	8.573
7.023	198.90	6.930	196.3	6.975
6.805	192.71	6.737	190.8	6.782
8.675	245.66	8.610	243.8	8.670
10.503	297.44	10.490	297.1	10.557

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
-0.004	0.987	1.710	43.43	-0.035
-0.004	0.987	1.823	46.31	0.078
-0.001	0.990	1.709	43.40	-0.037
0.001	0.993	1.720	43.68	-0.025
0.008	0.999	1.765	44.82	0.019
AVERAGE:	**0.991**	**1.745**	44.33	**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 dH@, the orifice differential pressure in inches of H$_2$0 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: 03/04/11 03/04/11

METERING SYSTEM THERMOCOUPLE CALIBRATION SHEET
EPA Reference Method
Metering System Pre-Test Calibration
Air Hygiene Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Make: Thermo Environmental
Model #: MST-C1
Serial #: 90693

Date:
Barometric Pressure: 29.85 (in. Hg)
Temperature (ASTM cal): 67.90 (°F)

Thermocouple	100 (°F)		600 (°F)		1200 (°F)	
	Reading	% Error	Reading	% Error	Reading	% Error
Stack	99.00	0.50	600.00	0.00	1197.00	0.25
Probe	100.00	0.00	601.00	0.17	1197.00	0.25
Filter	100.00	0.00	601.00	0.17	1197.00	0.25
Dryer	99.00	0.50	600.00	0.00	1197.00	0.25
Aux.	99.00	0.50	600.00	0.00	1197.00	0.25

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	67.90 (°F)	
	Reading	(±°F)
DGM In	68.0	0.10
DGM Out	68.0	0.10

Note: Calibrated against ASTM Reference Thermometer.

SIGNATURE: Craig McCarty ____________________ DATE: 03/04/11 03/04/11

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 Assett ID(s): **Probe:** samp-hp-0052 **Hotbox:** samp-bh-0014 **Gooseneck:** samp-ad-0034

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]3-4-11 (5 point)

Barometric Pressure: 29.85

Thermo-couples		**Temps (°F)**	**Signature**		**Date**	
Stack	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Filter	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				
Exit	**Ref**	68.00	Craig McCarty		03/04/11	03/04/11
	Read	68.00				
	±°F	0.00				

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 Assett ID: samp-cp-0010

Filename: C:\Users\jfahlenkamp\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\5ZODGNTC\[SAMP-CP-0010 Calibration 3-4-11.xls]First (3 point)

Make:	Thermo Environmental	Date:	03/20/11
Model #:	MST-C1	Barometric Pressure:	30.18 (in. Hg)
Serial #:	90693	Theoretical Critical Vacuum:	14.24 (in. Hg)

DRY GAS METER READINGS

ΔH	Time	Volume			Initial Temperature	
		Initial	Final	Total	Inlet	Outlet
(in. H2O)	(min)	(ft³)	(ft³)	(ft³)	(°F)	(°F)
1.10	12.00	110.100	117.510	7.410	88.0	88.0
1.10	12.00	117.510	125.010	7.500	86.0	87.0
1.10	12.00	125.010	132.510	7.500	86.0	87.0

Final Temperature		Orifice	K' Orifice	Actual	Ambient Temperature		
Inlet (°F)	Outlet (°F)	Serial# (number)	Coefficient (see above)	Vacuum (in. Hg)	Initial (°F)	Final (°F)	Average (°F)
86.0	87.0	17	0.4454	20.0	86.0	85.0	85.5
86.0	87.0	17	0.4454	20.0	85.0	85.0	85.0
86.0	87.0	17	0.4454	20.0	85.0	86.0	85.5

RESULTS

DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (ft³)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft³)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft³)
7.228	204.69	6.906	195.6	7.077
7.326	207.46	6.910	195.7	7.073
7.326	207.46	6.906	195.6	7.077

DRY GAS METER CALIBRATION FACTOR Y		ORIFICE CALIBRATION FACTOR ΔH@		
Variation (number)	Value (number)	Value (in. H2O)	Value (mm H2O)	Variation (in. H2O)
0.008	0.956	1.817	46.15	-0.001
-0.004	0.943	1.817	46.15	-0.001
-0.004	0.943	1.819	46.20	0.001
AVERAGE:	**0.947**	**1.818**	46.17	**PASSED**
LAST 5-PT:	**0.991**	**1.745**	**PASSED**	5-PT Date:
% DIFF:	**4.6%**	**4.1%**		03/04/11

40 CFR - CHAPTER I - PART 60
Appendix A, Method 5
10.3.2 Calibration After Use

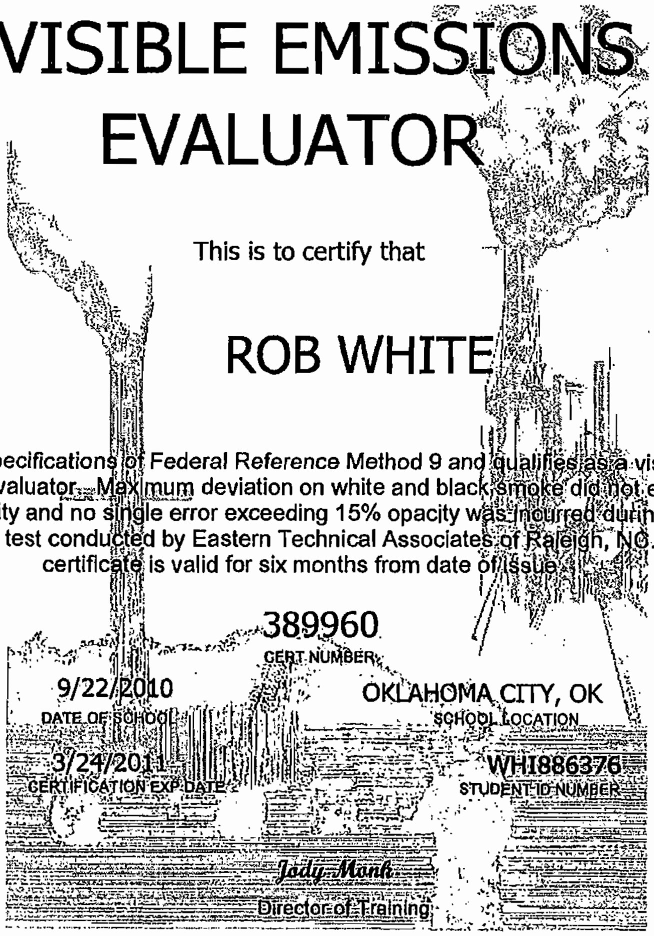
After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single, intermediate orifice setting (based on the previous field test)....Calculate the average value of the DGM calibration factor. If the value has changed by more than 5 percent, 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 dH@, the orifice differential pressure in inches of H_20 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: Thomas K Graham Thomas Graham DATE: 03/20/11



VISIBLE EMISSIONS EVALUATOR

This is to certify that

ROB WHITE

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.

389960
CERT NUMBER

9/22/2010
DATE OF SCHOOL

OKLAHOMA CITY, OK
SCHOOL LOCATION

3/24/2011
CERTIFICATION EXP DATE

WHI886376
STUDENT ID NUMBER

Jody Monk
Director of Training

EASTERN TECHNICAL ASSOCIATES

ROB WHITE

WHI886376 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	389960
SCHOOL LOCATION	DATE OF SCHOOL	CERT NUMBER
TULF06	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: March 12, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular[1] Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	97.114	16.0430	15.58	93.80	994.85	966.13	895.75	869.90
Ethane	C_2H_6	1.380	30.0700	0.41	2.50	1,743.15	24.06	1,594.41	22.00
Propane	C_3H_8	0.178	44.0970	0.08	0.47	2,478.35	4.41	2,280.17	4.06
iso-Butane	iC_4H_{10}	0.021	58.1230	0.01	0.07	3,203.11	0.67	2,955.38	0.62
n-Butane	nC_4H_{10}	0.019	58.1230	0.01	0.07	3,213.35	0.61	2,965.62	0.56
Iso-Pentane	iC_5H_{12}	0.004	72.1500	0.00	0.02	3,940.87	0.16	3,643.50	0.15
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.006	86.1770	0.01	0.03	4,684.54	0.28	4,337.82	0.26
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	0.914	44.0100	0.40	2.42	0.00	0.00	0.00	0.00
Nitrogen	N_2	0.364	28.0134	0.10	0.61	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**16.61**	**100.00**	**dry**	**996.32**	**dry**	**897.55**
						wet[2,5]	**973.35**	**wet[2,5]**	**876.86**

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.609	lb/lb-mole
Btu per lb. of gas[4] =	23,108.779	gross (HHV)
Btu per lb. of gas[4] =	20,817.951	net (LHV)
Density of fuel gas[2] =	0.0431	lb/cu. ft
Wt % VOC in fuel gas =	0.66	%
Specific Gravity[1] =	0.5735	

Component	Wt%
carbon	73.43
oxygen	1.76
hydrogen	24.20
nitrogen	0.61
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) =	**8,641.62**
(Based on EPA RM-19) at 68 deg F and 14.696 psia	

F-Factor Calculation:

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

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

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

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

References:

[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: 1030-2011030325-001A

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

March 21, 2011

Sample ID:		Sampled By:	JF	
Station Name :	Unit 3C Baseland	Sample Of:	Gas	Spot
Station Number :	2190	Sample Date:	03/12/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:	bv-10-westcount.fll-comp#2	PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/18/2011 10:43:01
Nitrogen	0.364	0.614				
Carbon Dioxide	0.914	2.422				
Methane	97.114	93.803				
Ethane	1.380	2.498	0.368			
Propane	0.178	0.473	0.049			
Iso Butane	0.021	0.073	0.007			
n-Butane	0.019	0.066	0.006			
Iso Pentane	0.004	0.017	0.001			
Hexanes Plus	0.006	0.034	0.003			
	100.000	100.000	0.434			

	C2 +	C3 +	iC5 +
GPM TOTAL :	0.434	0.066	0.004

Relative Density	Real Gas	0.5745
Calculated Molecular Weight		16.61
Compressibility Factor		0.9979

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	1014
	Saturated Basis	996

Comments :

Cylinder Number 2190

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: 1030-2011030325-001A

March 21, 2011

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

Sample ID:
Station Name: Unit 3C Baseland
Station Number : 2190
Location: Tulsa, OK
Sample Point: bv-10-westcount.fll-comp#2

Sampled By: JF
Sample Of: Gas
Sample Date: 03/12/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	<1.0	PPMW	1.0	EM	03/21/11
Total Sulfur By UV	ASTM-D-6667	<0.0001	Wt%.		EM	03/21/11
Total Sulfur By UV	ASTM-D-6667	<0.032	gr/100 cu.ft.		EM	03/21/11

Comments: Cylinder Number: 2190
Sample On: 03/12/2011

Hydrocarbon Laboratory Manager

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

Client: Florida Power and Light
Location: West County Energy Center
Date: March 13, 2011
Project #: bv-10-westcounty.fl-comp#2

Natural Gas - Fuel Analysis

Standardized to 68 deg F and 14.696 psia - EPA Standards

Gas Component		Mole (%)	Molecular[1] Weight (lb/lb-mole)	Lbs Component per Lb-Mole of Gas	Wt. % of Component	Ideal Gross[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [HHV] (Btu/SCF)	Ideal Net[1,3] Heating Value (Btu/ft^3)	Fuel Heat Value [LHV] (Btu/SCF)
Methane	CH_4	97.761	16.0430	15.68	95.05	994.85	972.57	895.75	875.70
Ethane	C_2H_6	0.835	30.0700	0.25	1.52	1,743.15	14.56	1,594.41	13.31
Propane	C_3H_8	0.080	44.0970	0.04	0.21	2,478.35	1.98	2,280.17	1.82
iso-Butane	iC_4H_{10}	0.009	58.1230	0.01	0.03	3,203.11	0.29	2,955.38	0.27
n-Butane	nC_4H_{10}	0.009	58.1230	0.01	0.03	3,213.35	0.29	2,965.62	0.27
Iso-Pentane	iC_5H_{12}	0.000	72.1500	0.00	0.00	3,940.87	0.00	3,643.50	0.00
n-Pentane	nC_5H_{12}	0.000	72.1500	0.00	0.00	3,948.75	0.00	3,648.32	0.00
Hexanes	C_6H_{14}	0.005	86.1770	0.00	0.03	4,684.54	0.23	4,337.82	0.22
Heptanes	C_7H_{16}	0.000	100.2040	0.00	0.00	5,419.94	0.00	5,023.77	0.00
Octanes	C_8H_{18}	0.000	114.2310	0.00	0.00	6,155.14	0.00	5,709.23	0.00
Carbon Dioxide	CO_2	0.950	44.0100	0.42	2.53	0.00	0.00	0.00	0.00
Nitrogen	N_2	0.351	28.0134	0.10	0.60	0.00	0.00	0.00	0.00
Hydrogen Sulfide	H_2S	0.000	34.0800	0.00	0.00	627.54	0.00	578.00	0.00
Oxygen	O_2	0.000	31.9988	0.00	0.00	0.00	0.00	0.00	0.00
Helium	He	0.000	4.0026	0.00	0.00	0.00	0.00	0.00	0.00
Hydrogen	H_2	0.000	2.0159	0.00	0.00	319.34	0.00	269.82	0.00
Totals		**100.000**		**16.50**	**100.00**	**dry**	**989.92**	**dry**	**891.59**
						wet[2,5]	**967.10**	**wet[2,5]**	**871.03**

Characteristics of Fuel Gas		
Molecular Weight of gas =	16.501	lb/lb-mole
Btu per lb. of gas[4] =	23,110.040	gross (HHV)
Btu per lb. of gas[4] =	20,814.391	net (LHV)
Density of fuel gas[2] =	0.0428	lb/cu. ft
Wt % VOC in fuel gas =	0.30	%
Specific Gravity[1] =	0.5697	

Component	Wt%
carbon	73.31
oxygen	1.84
hydrogen	24.25
nitrogen	0.60
helium	0.00
sulfur	0.00
Total	**100.00**

F-Factor (SCF dry exhaust per MMBtu [HHV]) = 8,639.90
(Based on EPA RM-19) at 68 deg F and 14.696 psia

F-Factor Calculation:

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

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

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

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

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: 1030-2011030325-002A

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

March 21, 2011

Sample ID:		Sampled By:	JF	
Station Name :	Unit 3C Base w/DB	Sample Of:	Gas	Spot
Station Number :	003201	Sample Date:	03/13/2011	
Station Location :	Tulsa, OK	Sample Conditions:	N.G. Pres. ,	N.G. Temp.
Sample Point:	bv-10-westcount.fll-comp#2	PO / Ref. No:		

ANALYTICAL DATA

Components	Mol %	Wt %	GPM at 14.696 psia	Method	Lab Tech.	Date Analyzed
				GPA-2261 M	PW	3/18/2011 10:39:38
Nitrogen	0.351	0.596				
Carbon Dioxide	0.950	2.534				
Methane	97.761	95.042				
Ethane	0.835	1.522	0.223			
Propane	0.080	0.214	0.022			
Iso Butane	0.009	0.032	0.003			
n-Butane	0.009	0.032	0.003			
Hexanes Plus	0.005	0.028	0.002			
	100.000	100.000	0.253			

	C2 +	C3 +	iC5 +	
GPM TOTAL :	0.253	0.030	0.002	
Relative Density	Real Gas			0.5706
Calculated Molecular Weight				16.50
Compressibility Factor				0.9980

Calculated Gross BTU per ft³ @14.696 psia & 60°F

Real Gas	Dry Basis	1007
	Saturated Basis	989

Comments :

Cylinder Number 3201

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: 1030-2011030325-002A

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

March 21, 2011

Sample ID:
Station Name: Unit 3C Base w/DB
Station Number : 003201
Location: Tulsa, OK
Sample Point: bv-10-westcount.fll-comp#2

Sampled By: JF
Sample Of: Gas
Sample Date: 03/13/2011
Sample Condition:
PO / Ref. No:

ANALYTICAL DATA

Test	Method	Result	Unit	Detection Limit	Lab Tech.	Date Analyzed
Total Sulfur By UV	ASTM-D-6667	<1.0	PPMW	1.0	EM	03/21/11
Total Sulfur By UV	ASTM-D-6667	<0.0001	Wt%.		EM	03/21/11
Total Sulfur By UV	ASTM-D-6667	<0.032	gr/100 cu.ft.		EM	03/21/11

Comments: Cylinder Number: 3201

Sample On: 03/13/2011

Hydrocarbon Laboratory Manager

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

SAMPLE DESCRIPTION AND CHAIN OF CUSTODY RECORD

Project Number:	bv-10-westcount.fl-comp #2	Laboratory Analysis Requested:	

Sample Number	Location	Date	Volume	Analysis Method			
				ASTM 6667-0	GPA 2261		
002190	Unit 3C BaseLoad	3/12/11		X	X		
003201	Unit 3C Base w/DB	3/13/11		X	X		
	Sulfur reported in gr/100ft²						
	wt%						
	email results to: jake@airhygiene.com						

Relinquished by: (Signature) Date: 3/13/11 Time: 17:00 Received by: (Signature) Date: 3/17/11 Time: 150pm

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

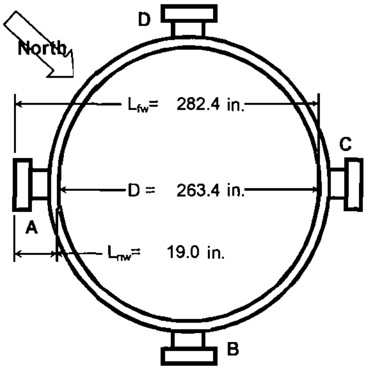
Test Information	
Date	03/12/11
Project #	bv-10-westcounty.fl-comp#2
Unit Number	3C
Load	Base Load
Number of Ports Available	4
Number of Ports Used	4

Stack and Test Type	
○ Isokinetic Traverse (Wet Chemistry Testing) ○ Velocity Traverse (Flow and Flow RATA Test) ● **Stratification Traverse (Compliance Test)** ☐ RM 20 ○ Stratification Traverse (RATA) ☐ Part 60 ☐ Part 75	**Circular Stack**

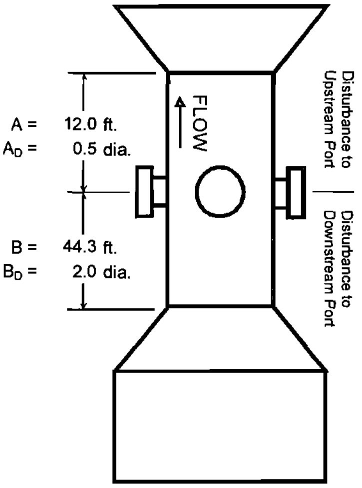
METHOD 1 - STRATIFICATION TEST FOR A CIRCULAR SOURCE

Company	Florida Power and Light	**Date**	03/12/11
Plant Name	West County Energy Center	***Project #***	bv-10-westcounty.fl-comp#2
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_s)	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 Comp Stratification**	
Down (B_D) Stream	Up (A_D) Stream	Particulate Points	Velocity Points	**Criteria**	**Points**
2.00-4.99	0.50-1.24	24	16	● RM 7E 8.1.2	12 RM1 pts
5.00-5.99	1.25-1.49	20	16	○ 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		
>= 8.00	>=2.00	8 or 12[2]	8 or 12[2]	Minimum Number of Traverse Points RATA Stratification	
Upstream Spec		24	16		
Downstream Spec		24	16		
Traverse Pts Required		24	16	Criteria	Points
				○ Part75/60	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.

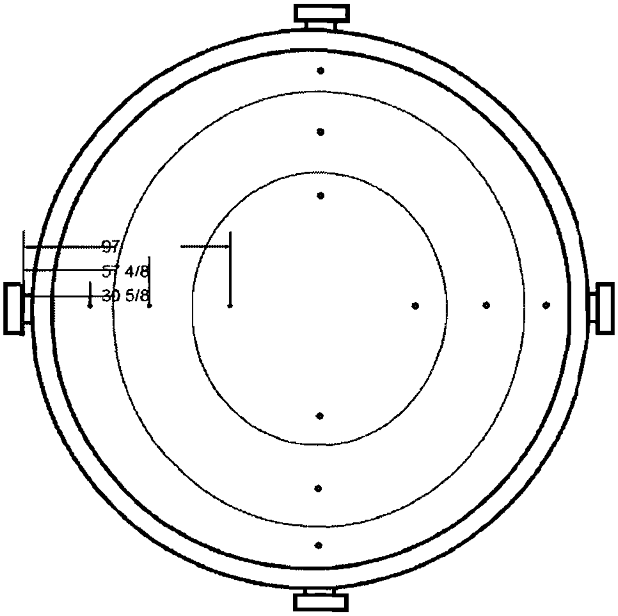
[2] 8 for Circular Stacks 12 to 24 inches
12 for Circular Stacks over 24 inches

Number of Traverse Points Used

4	**Ports by**	3	**Pts / port**	**Stratification Traverse (Compliance Test)**
12	**Pts Used**	12	**Required**	

Traverse Point Locations

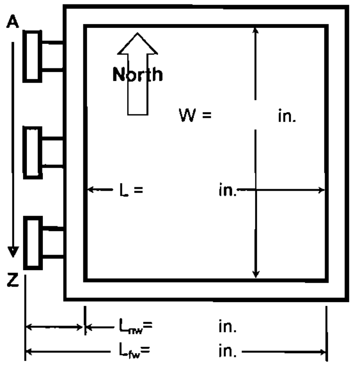
Traverse Point Number	**Percent of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
	%	in.	in.
1	4.4%	11 5/8	30 5/8
2	14.6%	38 4/8	57 4/8
3	29.6%	78	97
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			



METHOD 1 - STRATIFICATION TEST FOR A RECTANGULAR SOURCE

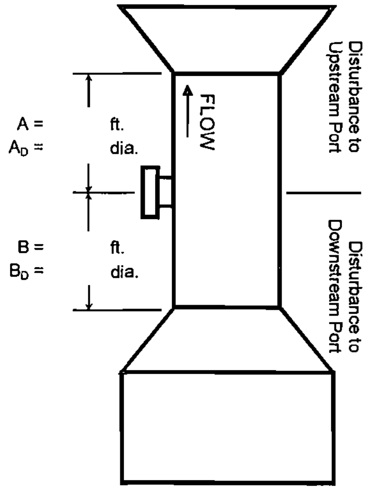
Company		**Date**	
Plant Name		**Project #**	
Equipment		**# of Ports Available**	
Location		**# of Ports Used**	

Rectangular Stacks or Ducts			
Length to Far Wall of Stack	(L_{fw})		in.
Length to Near Wall of Stack	(L_{nw})		in.
Length of Stack	(L)		in.
Width of Stack	(W)		in.
Equivalent Stack Diam	(D_e)		in.
Area of Stack	(A_s)		ft^2



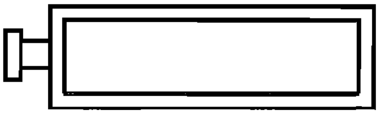
Distance from Disturbances to Port			
Distance Upstream	(A)		in.
Diameters Upstream	(A_D)		diameters
Distance Downstream	(B)		in.
Diameters Downstream	(B_D)		diameters

Number of Traverse Points Required					
Diameters to Flow Disturbance		Minimum Number of[1] Traverse Points		**Minimum Number of Traverse Points Stratification**	
Down Stream	Up Stream	Particulate Points	Velocity Points	**Criteria**	**Points**
2.00-4.99	0.50-1.24	25	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		
7.00-7.99	1.75-1.99	12	12		
>= 8.00	>=2.00	9 or 12[2]	9 or 12[2]	Minimum Number of	
Upstream Spec				Traverse Points	
Downstream Spec				Stratification	
Traverse Pts Required				Criteria	Points
[1] Check Minimum Number of Points for the Upstream				○ Part75/60	12 RM1 pts
and Downstream conditions, then use the largest.				○ 75 abrv (a)	3 points
[2] 9 for Rectangular Stacks 12 to 24 inches				○ 75 abrv (b)	6 points
12 for All Stacks over 24 inches					



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

Traverse Point Locations			
Traverse Point Number	**Percent of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
	%	in.	in.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			



STRATIFICATION TRAVERSE (COMPLIANCE TEST) RESULTS

Company	Florida Power and Light	**Date**	03/12/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
Equipment	Mitsubishi 501G	**# of Ports Available**	4
Location	Loxahatchee, Florida	**# of Ports Used**	4

Stack Dimensions			
Diameter or Length of Stack	(D)	263.38	in.
Width of Stack	(W)		in.
Area of Stack	(A_s)	378.35	ft^2

Traverse Data			
4	**Ports by**	3	**Pts / port**
12	**Pts Used**	12	**Required**
Run Start	9:19:07	**Run End**	9:59:37

Traverse Point	**Time Per Point**	**Point Start Time**	**Point Stop Time (Reading)**	**O2**	**Percent Difference**	**CO**	**Percent Difference**	**NOx**	**Percent Difference**
	min.	hh:mm:ss	hh:mm:ss	%	%	ppm	%	ppm	%
D-3	3.00	9:19:07	9:22:07	13.11	0.46%	0.55	0.30%	3.14	8.37%
D-2	3.00	9:22:07	9:25:07	13.10	0.53%	0.56	2.13%	2.88	0.60%
D-1	3.00	9:25:07	9:28:07	13.12	0.38%	0.60	9.42%	2.96	2.16%
C-3	4.50	9:28:07	9:32:37	13.15	0.15%	0.58	5.78%	3.14	8.37%
C-2	3.00	9:32:37	9:35:37	13.15	0.15%	0.65	**18.54%**	2.69	7.16%
C-1	3.00	9:35:37	9:38:37	13.14	0.23%	0.57	3.95%	2.84	1.98%
B-3	5.00	9:38:37	9:43:37	13.18	0.08%	0.55	0.30%	3.37	**16.31%**
B-2	3.00	9:43:37	9:46:37	13.19	0.15%	0.54	1.52%	2.76	4.75%
B-1	3.00	9:46:37	9:49:37	13.19	0.15%	0.50	8.81%	2.47	14.75%
A-3	4.00	9:49:37	9:53:37	13.22	0.38%	0.50	8.81%	3.36	15.96%
A-2	3.00	9:53:37	9:56:37	13.24	0.53%	0.50	8.81%	2.67	7.85%
A-1	3.00	9:56:37	9:59:37	13.25	**0.61%**	0.48	12.46%	2.49	14.06%
Average				13.17		0.55		2.90	

STRAT TEST DETERMINED SAMPLE POINTS FOR CIRCULAR STACK

Company	Florida Power and Light	**Date**	03/12/11
Plant Name	West County Energy Center	**Project #**	bv-10-westcounty.fl-comp#2
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**	9:19:07	**Run End**	9:59:37

40 CFR 60, Appendix A, Method 7E Criteria

Stratification Results	
Maximum Percent Difference	18.54 % for CO
Maximum Pollutant Conc. Diff.	0.47 ppm for NOx
Maximum Diluent Conc. Diff.	0.08 % for O2
Stack Diameter	263.38 in.

Stratification Conclusions	
Maximum % Diff.	Percent Diff. >10% Failed Stratification Test
Maximum Conc. Diff.	Conc. Diff. ≤ 0.5% Passed 3A 8.1 Three Pt. Criteria
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

Traverse Point Number	**Percent of Stack Diameter**	**Distance from Inside Wall**	**Distance Including Reference Length**
	%	in.	in.
1	6.0%	15 6/8	34 6/8
2	17.9%	47 2/8	66 2/8
3	29.9%	78 6/8	97 6/8

Test Type
☐ Moisture, for MW
☐ Moisture, for wet-to-dry
☑ Gas
☐
☐ 6.5.6(b)(2) alt. points could apply